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RESEARCH MEMORANDUM

PRESSURES AND ASSOCIATED AERODYNAMIC AND LOAD CHARACTERISTICS FOR TWO BODIES OF REVOLUTION AT TRANSONIC SPEEDS

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NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

WASHINGTON

March 11, 1954

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NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

RESEARCH MEMORANDUM

PRESSURES AND ASSOCIATED AERODYNAMIC AND LOAD CHARACTERISTICS FOR TWO BODIES OF REVOLUTION AT TRANSONIC SPEEDS

By Harold L. Robinson

SUMMARY

Analysis of the results obtained from a transonic wind-tunnel investigation of two bodies of revolution having the same nose shape, one incorporating a cylindrical afterbody and the other incorporating a curved afterbody, indicated that the pressures over the forward portions of the bodies were the same, whereas, the induced velocities over the rearward portions of the curved body were greater than those over the cylindrical body. However, the cross-section normal loads were greater over the rearward portions of the cylindrical body. Variation of the aerodynamic characteristics with Mach number was rather small for both bodies. The cylindrical body exhibits better stability characteristics than the curved body. The theory of NACA Rep. 1048 regarding the aerodynamic characteristics of the bodies is in fair agreement with the results of this paper.

INTRODUCTION

A detailed study of the pressures and resulting forces for a body of revolution, designated "curved body" in this report, at transonic speeds has been presented in reference 1.

The present tests were undertaken in order to provide aerodynamic load data for a body of revolution having an ogive nose and cylindrical afterbody and to compare the aerodynamic characteristics of this body with the body of reference 1 at transonic speeds. The body used in the present test is designated "cylindrical body" herein. A comparison of various theoretical aerodynamic parameters with experimental values is included.

The tests reported herein were made for a Mach number range from 0.6 to 1.13 and an angle-of-attack range from 0° to 20°. The Reynolds number

range corresponding to the Mach number range varied from 3.3×10^6 to 3.9×10^6 per foot of length.

SYMBOLS

A_p	plan-form area of body
C_{M_F}	pitching-moment coefficient around the nose, based on maximum body cross-sectional area and body length
C_{N_F}	normal-force coefficient, based on maximum body cross-sectional area
c_{d_c}	section drag coefficient of an infinite cylinder
c_n	transverse section normal-force coefficient, $\dfrac{N_t}{qD\ d(x)}$
c_{nn}	meridian load coefficient, $\dfrac{N_n}{qLR_{max}\ d(\theta)}$
D	diameter of body at any station
L	length of body
M	Mach number
N_n	elemental force on meridian body section of width $R\ d(\theta)$ (force vector is normal to body axis and makes an angle θ with vertical plane of symmetry)
N_t	elemental force on transverse body section of length $d(x)$ (force vector is normal to horizontal plane of symmetry)
P	pressure coefficient
Q	volume of body
q	dynamic pressure
R	radius of body at any station
S_b	base area of body

x distance from nose of model, positive rearward

x_m moment center

x_p centroid of body plan-form area

x_{cp} center-of-pressure location

y distance from vertical plane of symmetry

α angle of attack

η ratio of the drag coefficient of a finite cylinder to the section drag coefficient of an infinite cylinder at $\alpha = 90^\circ$

θ meridian station, 0° at top

Subscripts:

max maximum value

L lower surface

U upper surface

APPARATUS AND METHODS

Tunnel

All the data discussed herein were obtained from tests conducted in the Langley 8-foot transonic tunnel. At present, this tunnel has a dodecagonal slotted test section and is capable of continuously variable operation through the speed range up to a Mach number of 1.14. A test section used previously in this tunnel did not incorporate slots, but had a closed throat. All the data for the cylindrical body and most of the data for the curved body were obtained from tests in the slotted test section. A small portion of the data for the curved body was obtained from tests in the closed-throat test section.

Tunnel-wall-interference corrections were not applied to the data obtained from tests in the slotted test section because choking and blockage effects are negligible, especially for the small ratio of model to tunnel size of the present tests. Effects of wall-reflected disturbances have been reduced by offsetting the model from the tunnel center line.

Bodies

A drawing of the two bodies is presented in figure 1. The cylindrical body has the same dimensions as body D of reference 2. The curved body is the same body as that used in references 1 and 3 and is similar to, but slightly longer than, body A of reference 2. Both the curved and cylindrical bodies have the same dimensions forward of the 20-inch body station.

Each of the models was instrumented with six rows of orifices spaced along meridians of the body. Each row contained 20 or more orifices. The relative size of the stings employed to support the model in the tunnel is indicated in figure 1.

Measurements

Pressure.- The pressures existing on the surface of the cylindrical body were measured by connecting the orifices to a multitubed manometer. In order to determine the forces on the model, these pressures were integrated as discussed in the section of this report entitled "Presentation of Results." The pressure data and associated aerodynamic parameters for the curved body were obtained from references 1 and 3.

The repeatability of the pressure data presented herein as affected by the pressure measurements, angle of attack, orifice size and location, and other factors may be judged from figure 2. The largest errors occur near the nose where they are as large as $\Delta P = \pm 0.015$. The accuracy is much better over the remainder of the body. The average error, as determined from the data presented in figure 2, is $\Delta P = \pm 0.005$.

Angle of attack.- The angle of attack for the cylindrical body was measured by an electrical strain-gage pendulum device mounted internally near the base of the support sting. Sting and model deflections occurring ahead of this point, due to forces and moments acting on the model, were determined from static tests. These corrections were applied to the angles of attack, although the maximum deflections occurring during the investigation were approximately 0.1°. The angles of attack were also corrected for the approximately 0.1° upflow existing in the Langley 8-foot transonic tunnel. The absolute accuracy of the angle-of-attack measurements is estimated to be within 0.1°.

PRESENTATION OF RESULTS

Pressure Coefficients

All the pressures measured for the cylindrical body are presented in table 1. The longitudinal distribution of pressure coefficients for the cylindrical body at 0° angle of attack is presented in figure 3. Also shown in this figure is the pressure distribution for the curved body from references 1 and 3. The longitudinal distribution of pressure coefficient at the other angles of attack are presented in figure 4 at three Mach numbers (approximately 0.8, 1.00, and 1.13).

Normal Force and Pitching Moment

A comparison of the normal-force and pitching-moment coefficients for the two bodies is presented in figures 5 and 6, respectively. All the data for the curved body were obtained from reference 1. In order to compare the pitching-moment characteristics of the two bodies, the moment coefficients were taken about the nose of the bodies.

The integral equation used to compute the normal-force coefficients for the cylindrical body was

$$C_{N_F} = -\frac{8L}{D_{max}}\int_0^{0.5} \cos\theta\left[\int_0^1 P\,\frac{D}{D_{max}}\,d\left(\frac{x}{L}\right)\right]d\left(\frac{\theta}{2\pi}\right)$$

and that used to compute the pitching-moment coefficient was

$$C_{M_F} = \frac{8L}{D_{max}}\int_0^{0.5} \cos\theta\left[\int_0^1 P\,\frac{D}{D_{max}}\left(\frac{x}{L}\right)d\left(\frac{x}{L}\right)\right]d\left(\frac{\theta}{2\pi}\right)$$

The coefficients presented at $\alpha = 20^{\circ}$ could have been lowered as much as 25 percent of the value shown by changing the fairings of the graphical integrations. However, the data presented for the cylindrical body agree with the strain-gage data presented in reference 2. The fairing choice does not exist at $\alpha \leqq 8^{\circ}$ but this margin increases with angle of attack as the angle is increased from 8°.

The theoretical values of normal-force and pitching-moment coefficient shown in figures 5 and 6 were computed by the method described in reference 4. The equations for these coefficients may be written as follows:

$$C_{N_F} = \frac{8S_b}{\pi D_{max}^2} \alpha + 4\eta c_{d_c} \frac{A_p}{\pi D_{max}^2} \alpha^2$$

$$C_{M_F} = \frac{8}{\pi D_{max}^2}\left(\frac{Q}{L} - S_b\right) \alpha - 4\eta c_{d_c} \frac{A_p}{\pi D_{max}^2}\left(\frac{x_p}{L}\right) \alpha^2$$

The values of η and c_{d_c} used in the calculations for the cylindrical body were 0.7 and 1.2 and were chosen from reference 5 and references 6 and 7, respectively. The plan-form area A_p, the body volume Q, and the location of the centroid of the body plan-form area x_p were determined from graphical integrations of suitable geometric parameters.

Center of Pressure

A comparison of the center-of-pressure locations for the two bodies is presented in figure 7. The data for the cylindrical body were computed from the normal-force and pitching-moment coefficients of figures 5 and 6. The center-of-pressure data for the curved body were obtained from reference 1.

Detailed Aerodynamic Loads

The meridian normal-load distribution is presented for three Mach numbers (0.80, 1.00, and 1.13) through the angle-of-attack range in figure 8. This coefficient c_{nn} is defined in such a manner that the load perpendicular to the fuselage center line on a stringer section $Rd(\theta)$ wide is $c_{nn}qLR_{max}\,d(\theta)$. Accordingly, c_{nn} is computed from the graphical integration along a body meridian as follows:

$$c_{nn} = -\int_0^1 \frac{D}{D_{max}} P \, d\left(\frac{x}{L}\right)$$

The longitudinal distribution of body cross-section normal loads at $M = 1.00$ is presented in figure 9. The pressure data were computed by a graphical integration

$$c_n = \int_0^1 \left(P_L - P_U\right) d\left(\frac{y}{R}\right)$$

The theoretical values of $c_n \frac{D}{D_{max}}$ were computed by the method of reference 4. The equation for a body of revolution may be written as follows:

$$c_n = \pi\left(\frac{dD}{dx}\right) \alpha + \eta c_{d_c} \alpha^2$$

DISCUSSION OF RESULTS

Pressure Distribution

The pressures over the nose of both bodies, forward of the 20-inch station, are very similar to each other through the range investigated (figs. 3 and 4). Some of the differences observed near the tip of the nose are due to slight differences in the body shape at the apex. In general, the pressures over the rearward portions of the curved body are lower than those over the rearward portions of the cylindrical body. The typically characteristic rearward movement of the shock location with Mach number increases may be observed in figure 3. At $M = 0.99$ the shock is located at approximately the 20-inch body station of the cylindrical body, whereas at $M = 1.03$ the shock has moved to the 37-inch body station.

The compressions shown for the cylindrical body in figure 3 at $M = 1.08$ and 1.10 at approximately the 30- and 34-inch stations, respectively, are probably due to the bow wave reflected from the tunnel wall and would not be evidenced in free flight. The expansions seen at the rear of the cylindrical body are caused by the air turning around the corner.

Normal-Force Characteristics

As shown in figure 5, the cylindrical body develops greater normal force at a given angle of attack and Mach number than the curved body. The change in normal-force coefficient with Mach number is insignificant at the lower angles of attack, but there is a small increase in normal-force coefficient with Mach number at the higher angles of attack.

The prediction of the normal-force coefficients by the method of reference 4 is rather accurate at the lower angles of attack. In general, the measured values fall well below the theoretical values at the higher angles of attack. As mentioned previously, alternative fairings permissible for the integrations would result in even lower values for the measured data. The cross-flow Mach number is less than 0.4 at the highest

stream Mach number and at an angle of attack of 20°. Accordingly, the values of c_{d_c} are constant. Therefore, the theory does not predict the variation of normal force with Mach number shown by the measurements.

Pitching-Moment and Center-of-Pressure Characteristics

Examination of the pitching-moment data (fig. 6) indicates that the curved body exhibits either neutral or slightly unstable characteristics for the center of gravity at the nose or unstable characteristics for more rearward locations of the center of gravity. The cylindrical body exhibited more stable characteristics inasmuch as the center of pressure is located behind the 12-inch station for all conditions. It is also noted that the variation of the center-of-pressure location with Mach number is irregular and small (fig. 7).

The agreement of the measured pitching-moment coefficient with the theory is similar to that found for the normal-force coefficients. In general, when the normal-force coefficients are overpredicted, the negative pitching-moment coefficients are also overpredicted. Examination of the equations for C_{N_F} and C_{M_F}, given in the section entitled "Presentation of Results," indicates that the probable cause for the disagreement noted between the measured and predicted coefficients is associated with the values selected for η and c_{d_c}. Had lower values of c_{d_c} and η been used the agreement would have been better.

Detailed Load Characteristics

The maximum meridian load is developed at approximately the 105° meridian (fig. 8). It is observed that the loads do not vary appreciably with Mach number.

Examination of figure 9 indicates that although the cross-section normal loads over the forward portions of both bodies are similar, the loads over the rear portion of the cylindrical body are greater than those for the curved body. This is the reason that the pitching-moment characteristics of the cylindrical body are more stable than those for the curved body. The differences observed between the normal-force and pitching-moment characteristics for the two bodies are not caused by the added length of the cylindrical body.

Comparisons of the measured and theoretical values of cross-section normal-load coefficient indicate that the theory is in fair agreement with the measured values at angles of attack below 12°. The theoretical values show the same agreement at the forward and rearward portions of the cylindrical body. It is concluded that the errors between theory

and measurement for the cylindrical body at the higher angles of attack are due to the inadequacy of available data for selecting η and c_{d_c}. The disagreement between the theory and the measurements at the rearward end of the curved body may be due to sting interference. It should be noted that, at angles of attack above 12°, integration of the curves of figure 9 does not give as large a value for C_{N_F} as those plotted in figure 5. The data presented for the cylindrical body in figure 9 have been faired consistently with the data of reference 1, whereas the data of figure 5 agree with the strain-gage data of reference 2.

CONCLUSIONS

Analysis of the results obtained from a transonic wind-tunnel investigation of two bodies of revolution, one incorporating a cylindrical afterbody, the other incorporating a curved afterbody, indicates:

1. The pressures over the nose of both bodies are very similar although higher induced velocities exist over the rearward portions of the curved body; however, the cross-section normal-force coefficient is greater over the rearward portions of the cylindrical body.

2. At a given Mach number and angle of attack, the normal-force coefficient for the cylindrical body is greater than that for the curved body.

3. The center-of-pressure location was more rearward for the cylindrical body than for the curved body. Consequently, the cylindrical body exhibited more desirable stability characteristics.

4. The variation of normal-force and pitching-moment coefficients with Mach number is rather small, especially at the lower angles of attack.

5. The maximum meridian load for the cylindrical body occurs at approximately the 105° meridian.

6. The theoretical normal-force and pitching-moment characteristics of both bodies are in fair agreement with the results of this investigation.

Langley Aeronautical Laboratory,
National Advisory Committee for Aeronautics,
Langley Field, Va., December 9, 1953.

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TABLE I

PRESSURE DATA, CYLINDRICAL BODY

(a) M = 0.60

x, in.	Pressure coefficients at row -																	
	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°
	α = 20°						α = 16°						α = 12°					
0.50	-0.055	—	—	—	—	—	-0.002	—	—	—	—	—	0.027	—	—	—	—	—
1.50	-.062	—	—	—	—	—	-.035	—	—	—	—	—	-.025	—	—	—	—	—
2.50	-.057	-0.265	-0.304	-0.221	0.078	0.126	-.045	-0.158	-0.187	-0.100	0.109	0.300	-.031	-0.085	-0.094	-0.025	0.113	0.235
3.50	-.067	—	—	—	—	—	-.051	—	—	—	—	—	-.036	—	—	—	—	—
4.50	-.070	-.161	-.342	-.268	.009	—	-.058	-.141	-.218	-.141	.041	—	-.046	-.097	-.127	-.071	.054	—
5.50	-.074	—	—	—	—	—	-.060	—	—	—	—	—	-.051	—	—	—	—	—
6.50	-.055	-.155	-.334	-.298	-.059	.155	-.065	-.141	-.228	-.179	-.007	.173	-.059	-.106	-.140	-.105	.012	.121
8.50	-.058	-.142	-.326	-.300	-.065	.156	-.049	-.126	-.230	-.190	-.052	.145	-.045	-.105	-.146	-.110	-.005	.092
10.50	-.058	-.138	-.308	-.304	-.085	.151	-.040	-.112	-.224	-.205	-.051	.121	-.042	-.093	-.147	-.121	-.022	.080
12.50	-.048	-.130	-.280	-.305	-.095	.146	-.056	-.102	-.209	-.202	-.065	.105	-.054	-.080	-.139	-.121	-.032	.065
14.50	-.046	-.124	-.252	-.308	-.106	.124	-.059	-.096	-.198	-.211	-.079	.079	-.028	-.075	-.140	-.131	-.045	.044
16.50	-.047	-.118	-.216	-.301	-.113	.125	-.056	-.084	-.176	-.211	-.086	.077	-.020	-.065	-.129	-.130	-.049	.044
17.17	-.050	—	—	—	—	—	-.037	—	—	—	—	—	-.017	—	—	—	—	—
18.17	-.058	-.105	-.191	-.294	-.115	.127	-.037	-.077	-.156	-.205	-.088	.070	-.016	-.056	-.118	-.124	-.050	.039
19.17	-.046	—	—	—	—	—	-.027	—	—	—	—	—	-.005	—	—	—	—	—
20.17	-.038	-.099	-.167	-.283	-.106	.132	-.036	-.072	-.136	-.194	-.082	.076	-.011	-.044	-.104	-.114	-.044	.048
21.17	-.056	—	-.175	-.272	-.100	—	-.032	—	-.141	-.189	-.075	—	-.006	—	-.111	-.110	-.055	—
22.17	-.030	-.094	-.164	-.266	-.097	.136	-.028	-.065	-.132	-.181	-.075	.080	-.006	-.038	-.098	-.102	-.056	.053
23.17	-.026	—	-.149	-.260	-.096	—	-.024	—	-.117	-.174	-.068	—	-.004	—	-.095	-.101	-.032	—
24.17	-.027	-.091	—	-.253	-.092	.135	-.022	-.057	—	-.168	-.065	.080	-.005	-.034	—	-.099	-.028	.054
25.17	-.029	—	—	-.256	-.095	—	-.024	—	—	-.168	-.067	—	-.008	—	-.079	-.100	-.028	—
26.17	—	-.088	—	-.248	—	.157	—	-.055	—	-.160	—	.078	—	-.051	—	-.093	—	.052
27.17	-.026	—	-.119	-.254	—	—	-.019	—	-.103	-.167	-.053	—	-.009	—	—	-.098	-.020	—
28.17	-.028	-.085	-.107	-.248	—	.138	-.018	-.051	-.078	-.167	—	.078	-.011	-.032	—	-.096	—	.054
29.17	-.054	—	—	-.251	-.084	—	-.021	—	—	-.162	—	—	-.012	—	—	-.098	—	—
30.17	-.055	-.078	—	-.244	-.081	.140	-.018	-.046	—	-.158	-.058	.082	-.010	-.028	—	-.094	-.025	.058
31.17	-.056	—	-.102	-.241	-.094	—	-.013	—	-.068	-.155	-.054	—	-.007	—	—	-.093	-.023	—
32.17	-.043	-.077	-.101	-.241	-.095	.138	-.019	-.044	-.060	-.149	-.060	.080	-.012	-.029	—	-.095	-.026	.056
33.17	-.045	—	—	—	—	—	-.019	—	—	—	—	—	-.010	—	—	—	—	—
34.17	-.047	-.075	-.096	-.239	-.092	.146	-.018	-.036	-.060	-.143	-.061	.082	-.007	-.027	-.055	-.091	-.026	.058
35.17	-.055	—	—	—	—	—	-.018	—	—	—	—	—	-.007	—	—	—	—	—
36.17	-.060	-.072	-.095	-.239	-.092	.138	-.015	-.037	-.056	-.141	-.052	.086	-.005	-.028	-.057	-.093	-.024	.061
37.17	-.067	—	—	—	—	—	-.024	—	—	—	—	—	-.007	—	—	—	—	—
38.15	-.075	-.077	-.097	-.243	-.107	.108	-.030	-.040	-.057	-.147	-.065	.058	-.010	-.034	-.063	-.104	-.037	.058
38.40	-.084	—	—	—	—	—	-.036	—	—	—	—	—	-.011	—	—	—	—	—
38.65	-.093	—	—	—	—	—	-.046	—	—	—	—	—	-.025	—	—	—	—	—
38.90	-.118	—	—	—	—	—	-.065	—	—	—	—	—	-.041	—	—	—	—	—
39.15	-.181	-.123	-.128	-.268	-.210	-.014	-.131	-.083	-.086	-.187	-.160	-.056	-.102	-.072	-.101	-.162	-.138	-.072
	α = 8°						α = 4°						α = 0°					
0.50	0.075	—	—	—	—	—	0.115	—	—	—	—	—	0.175					
1.50	.011	—	—	—	—	—	.040	—	—	—	—	—	.087					
2.50	-.004	-0.025	-0.014	0.054	0.105	0.176	.021	0.025	0.042	0.059	0.091	0.114	.049					
3.50	-.010	—	—	—	—	—	.007	—	—	—	—	—	.033					
4.50	-.023	-.041	-.049	-.012	.052	—	-.012	-.011	-.005	.014	.041	.063	.015					
5.50	-.029	—	—	—	—	—	-.022	—	—	—	—	—	-.001					
6.50	-.039	-.058	-.067	-.043	.013	.076	-.036	-.036	-.029	-.013	.004	.031	-.016					
8.50	-.054	-.057	-.073	-.052	.005	.056	-.039	-.043	-.039	-.024	-.006	.012	-.016					
10.50	-.053	-.058	-.075	-.062	-.013	.044	-.059	-.046	-.043	-.050	-.012	.005	-.027					
12.50	-.026	-.045	-.072	-.068	-.019	.054	-.058	-.042	-.041	-.052	-.018	-.005	-.029					
14.50	-.024	-.047	-.074	-.070	-.028	.020	-.039	-.045	-.047	-.040	-.028	-.017	-.054					
16.50	-.014	-.057	-.061	-.068	-.029	.022	-.051	-.059	-.041	-.038	-.026	-.007	-.028					
17.17	-.010	—	—	—	—	—	-.051	—	—	—	—	—	-.029					
18.17	-.005	-.026	-.057	-.062	-.027	.019	-.026	-.052	-.037	-.054	-.022	-.010	-.025					
19.17	.005	—	—	—	—	—	-.014	—	—	—	—	—	-.016					
20.17	.001	-.014	-.045	-.055	-.022	.027	-.015	-.020	-.026	-.027	-.016	.001	-.016					
21.17	.010	—	-.048	-.049	-.015	—	-.011	—	-.031	-.021	-.008	—	-.014					
22.17	.014	-.009	-.038	-.040	-.009	.038	-.007	-.014	-.019	-.013	-.006	.008	-.007					
23.17	.018	—	-.033	-.039	-.007	—	-.004	—	-.019	-.013	-.004	—	-.004					
24.17	.021	-.005	—	-.036	-.005	.039	-.005	-.007	-.018	-.011	-.005	.010	-.005					
25.17	.019	—	-.026	-.037	-.003	—	-.003	—	—	-.011	-.001	—	-.005					
26.17	—	-.001	—	-.050	—	.039	—	-.005	—	-.006	—	.010	—					
27.17	.023	—	—	-.035	.004	—	-.001	—	-.015	-.009	.001	—	-.001					
28.17	.024	.001	—	-.034	—	.043	-.001	-.004	—	-.008	—	.012	.000					
29.17	.024	—	—	-.033	—	—	-.001	—	—	-.009	—	—	-.001					
30.17	.024	.004	—	-.030	.006	.044	.000	-.002	—	-.008	.002	.014	.001					
31.17	.026	—	—	-.029	.006	—	.001	—	—	-.006	.005	—	.001					
32.17	.023	.004	—	-.026	.004	.045	-.001	-.005	—	-.006	.004	.011	.001					
33.17	.024	—	—	—	—	—	.001	—	—	—	—	—	.000					
34.17	.027	.008	-.002	-.024	.005	.047	.001	-.001	-.005	-.005	.004	.014	.002					
35.17	.027	—	—	—	—	—	.000	—	—	—	—	—	-.001					
36.17	.030	.009	-.005	-.024	.007	.050	.002	-.005	-.007	-.008	.005	.014	-.002					
37.17	.028	—	—	—	—	—	.000	—	—	—	—	—	-.004					
38.15	.022	.003	-.009	-.052	-.001	.028	-.006	-.013	-.016	-.018	-.009	-.004	-.012					
38.40	.019	—	—	—	—	—	-.007	—	—	—	—	—	-.015					
38.65	.010	—	—	—	—	—	-.014	—	—	—	—	—	-.023					
38.90	-.005	—	—	—	—	—	-.028	—	—	—	—	—	-.036					
39.15	-.059	-.029	-.049	-.092	-.087	-.064	-.054	-.047	-.066	-.085	-.087	-.085	-.065					

TABLE I.- Continued

PRESSURE DATA, CYLINDRICAL BODY

(b) M = 0.80

x, in.	Pressure coefficients of row -																	
	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°
	α = 20°						α = 16°						α = 12°					
0.50	-0.002	—	—	—	—	—	0.024	—	—	—	—	—	0.053	—	—	—	—	—
1.50	-.038	—	—	—	—	—	-.020	—	—	—	—	—	-.011	—	—	—	—	—
2.50	-.053	-0.238	-0.298	-0.205	0.101	0.394	-.035	-0.127	-0.173	-0.084	0.126	0.321	-.021	-0.073	-0.085	-0.014	0.126	0.247
3.50	-.056	—	—	—	—	—	-.044	—	—	—	—	—	-.026	—	—	—	—	—
4.50	-.069	-.157	-.339	-.262	.024	—	-.056	-.128	-.212	-.156	.054	—	-.042	-.087	-.116	-.063	.060	—
5.50	-.071	—	—	—	—	—	-.057	—	—	—	—	—	-.048	—	—	—	—	—
6.50	-.079	-.156	-.343	-.291	-.033	.252	-.066	-.132	-.251	-.181	-.005	.186	-.059	-.105	-.143	-.092	.012	.125
8.50	-.057	-.149	-.330	-.305	-.063	.212	-.049	-.120	-.230	-.198	-.033	.151	-.048	-.100	-.148	-.113	-.009	.094
10.50	-.045	-.148	-.306	-.312	-.085	.188	-.042	-.113	-.225	-.209	-.053	.127	-.042	-.093	-.150	-.122	-.025	.078
12.50	-.047	-.139	-.267	-.315	-.094	.166	-.038	-.099	-.205	-.210	-.066	.112	-.053	-.080	-.143	-.126	-.035	.064
14.50	-.060	-.133	-.238	-.317	-.109	.135	-.043	-.098	-.191	-.218	-.083	.081	-.051	-.076	-.143	-.137	-.050	.041
16.50	-.056	-.124	-.198	-.308	-.117	.134	-.056	-.089	-.165	-.213	-.088	.081	-.020	-.066	-.129	-.134	-.053	.041
17.17	-.059	—	—	—	—	—	-.038	—	—	—	—	—	-.020	—	—	—	—	—
18.17	-.059	-.111	-.171	-.299	-.120	.125	-.059	-.075	-.141	-.207	-.092	.074	-.017	-.055	-.117	-.128	-.055	.055
19.17	-.046	—	—	—	—	—	-.026	—	—	—	—	—	-.004	—	—	—	—	—
20.17	-.055	-.102	-.144	-.284	-.109	.132	-.035	-.065	-.113	-.190	-.080	.085	-.012	-.042	-.100	-.117	-.043	.046
21.17	-.044	—	-.155	-.270	-.098	—	-.028	—	-.121	-.183	-.071	—	-.005	—	-.107	-.110	-.037	—
22.17	-.036	-.097	-.142	-.263	-.096	.137	-.025	-.062	-.110	-.171	-.070	.089	-.004	-.038	-.095	-.100	-.055	.055
23.17	-.031	—	-.129	-.257	-.094	—	-.022	—	-.095	-.167	-.067	—	-.004	—	-.087	-.099	-.032	—
24.17	-.025	-.090	—	-.253	-.085	.138	-.020	-.055	—	-.161	-.059	.092	-.002	-.034	—	-.095	-.026	.057
25.17	-.027	—	—	-.254	-.089	—	-.024	—	—	-.165	-.060	—	-.006	—	-.073	-.096	-.027	—
26.17	—	-.090	—	-.243	—	.136	—	-.052	—	-.155	—	.089	—	-.030	—	-.090	—	.055
27.17	-.022	—	-.110	-.249	-.076	—	-.016	—	-.082	-.157	-.051	—	-.006	—	—	-.092	-.019	—
28.17	-.024	-.089	-.096	-.245	—	.137	-.020	-.047	-.064	-.157	—	.091	-.008	-.029	—	-.093	—	.058
29.17	-.029	—	—	-.251	—	—	-.019	—	—	-.157	—	—	-.011	—	—	-.094	—	—
30.17	-.029	-.082	—	-.239	-.085	.142	-.018	-.045	—	-.149	-.053	.094	-.006	-.026	—	-.091	-.024	.060
31.17	-.028	—	-.094	-.236	-.079	—	-.014	—	-.054	-.145	-.049	—	-.006	—	—	-.088	-.021	—
32.17	-.034	-.081	-.093	-.237	-.089	.138	-.018	-.041	-.049	-.145	-.054	.095	-.011	-.025	—	-.089	-.026	.059
33.17	-.035	—	—	—	—	—	-.016	—	—	—	—	—	-.008	—	—	—	—	—
34.17	-.035	-.077	-.091	-.236	-.094	.139	-.015	-.036	-.045	-.140	-.054	.095	-.005	-.025	-.050	-.089	-.028	.059
35.17	-.041	—	—	—	—	—	-.016	—	—	—	—	—	-.005	—	—	—	—	—
36.17	-.044	-.077	-.092	-.236	-.086	.145	-.016	-.037	-.045	-.141	-.047	.097	-.002	-.027	-.054	-.090	-.024	.063
37.17	-.049	—	—	—	—	—	-.021	—	—	—	—	—	-.005	—	—	—	—	—
38.15	-.057	-.084	-.093	-.245	-.104	.115	-.025	-.042	-.051	-.146	-.063	.071	-.007	-.035	-.059	-.105	-.040	.036
38.40	-.063	—	—	—	—	—	-.029	—	—	—	—	—	-.012	—	—	—	—	—
38.65	-.075	—	—	—	—	—	-.041	—	—	—	—	—	-.020	—	—	—	—	—
38.90	-.100	—	—	—	—	—	-.061	—	—	—	—	—	-.039	—	—	—	—	—
39.15	-.175	-.135	-.127	-.268	-.217	-.027	-.130	-.090	-.088	-.191	-.171	-.067	-.104	-.080	-.104	-.173	-.156	-.094

x, in.	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°
	α = 8°						α = 4°						α = 0°
0.50	0.094	—	—	—	—	—	0.142	—	—	—	—	—	0.198
1.50	.018	—	—	—	—	—	.056	—	—	—	—	—	.104
2.50	-.003	-0.018	-0.010	0.039	0.116	0.184	.027	0.036	0.053	0.068	0.099	0.125	.062
3.50	-.010	—	—	—	—	—	.015	—	—	—	—	—	.041
4.50	-.028	-.059	-.044	-.010	.055	—	-.005	-.002	.005	.020	.044	.068	.021
5.50	-.036	—	—	—	—	—	-.019	—	—	—	—	—	.005
6.50	-.050	-.063	-.075	-.040	.010	.075	-.035	-.034	-.027	-.010	.009	.051	-.012
8.50	-.046	-.066	-.085	-.058	-.003	.053	-.036	-.041	-.039	-.027	-.008	.009	-.016
10.50	-.045	-.065	-.085	-.068	-.018	.038	-.040	-.046	-.045	-.035	-.018	.002	-.026
12.50	-.037	-.055	-.079	-.071	-.024	.030	-.038	-.041	-.042	-.036	-.022	-.004	-.026
14.50	-.035	-.055	-.083	-.080	-.036	.009	-.041	-.046	-.048	-.046	-.031	-.021	-.035
16.50	-.024	-.045	-.072	-.075	-.036	.012	-.030	-.039	-.042	-.042	-.029	-.015	-.030
17.17	-.022	—	—	—	—	—	-.030	—	—	—	—	—	-.028
18.17	-.016	-.035	-.065	-.071	-.034	.011	-.026	-.030	-.035	-.038	-.028	-.015	-.027
19.17	-.002	—	—	—	—	—	-.015	—	—	—	—	—	-.013
20.17	-.004	-.019	-.050	-.058	-.025	.024	-.014	-.018	-.025	-.028	-.020	-.002	-.013
21.17	.003	—	-.056	-.051	-.016	—	-.009	—	-.031	-.021	-.012	—	-.009
22.17	.008	-.015	-.041	-.044	-.014	.034	-.005	-.013	-.018	-.015	-.010	.008	-.005
23.17	.012	—	-.038	-.043	-.011	—	.000	—	-.015	-.011	-.005	—	-.001
24.17	.014	-.007	—	-.039	-.006	.036	.001	-.006	-.014	-.010	-.004	.010	.000
25.17	.013	—	-.029	-.040	-.006	—	.001	—	—	-.009	-.001	—	.001
26.17	—	-.005	—	-.035	—	.037	—	-.005	—	-.008	—	.008	—
27.17	.018	—	—	-.035	.002	—	.001	—	-.014	-.012	.002	—	.002
28.17	.019	-.005	—	-.036	—	.040	.005	-.004	—	-.010	—	.011	.002
29.17	.016	—	—	-.035	—	—	.001	—	—	-.011	—	—	.002
30.17	.018	.000	—	-.033	.001	.044	.004	-.001	—	-.009	.001	.014	.005
31.17	.019	—	—	-.028	.003	—	.003	—	—	-.008	.002	—	.003
32.17	.015	.002	—	-.028	.005	.044	.001	-.001	—	-.007	.002	.012	.004
33.17	.017	—	—	—	—	—	.005	—	—	—	—	—	.004
34.17	.020	.004	-.007	-.026	.005	.045	.004	.000	-.005	-.006	.000	.013	.005
35.17	.022	—	—	—	—	—	.004	—	—	—	—	—	.003
36.17	.024	.003	-.009	-.025	.006	.052	.004	-.005	-.007	-.008	.000	.016	.005
37.17	.020	—	—	—	—	—	-.001	—	—	—	—	—	.000
38.15	.016	-.002	-.016	-.036	-.006	.028	-.007	-.015	-.019	-.023	-.014	-.007	-.008
38.40	.013	—	—	—	—	—	-.011	—	—	—	—	—	-.014
38.65	.006	—	—	—	—	—	-.020	—	—	—	—	—	-.024
38.90	-.009	—	—	—	—	—	-.028	—	—	—	—	—	-.040
39.15	-.067	-.039	-.060	-.108	-.108	-.086	-.058	-.051	-.074	-.099	-.105	-.105	-.068

TABLE I.- Continued

PRESSURE DATA, CYLINDRICAL BODY

(c) M = 0.85

x, in.	Pressure coefficients of row -																	
	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°
	α = 20°						α = 16°						α = 12°					
0.50	0.003	----	----	----	----	----	0.055	----	----	----	----	----	0.062	----	----	----	----	----
1.50	-.041	----	----	----	----	----	-.014	----	----	----	----	----	-.006	----	----	----	----	----
2.50	-.054	-0.229	-0.295	-0.199	0.109	0.402	-.052	-0.125	-0.171	-0.079	0.135	0.328	-.017	-0.071	-0.084	-0.010	0.128	0.252
3.50	-.060	----	----	----	----	----	-.041	----	----	----	----	----	-.023	----	----	----	----	----
4.50	-.074	-.158	-.341	-.260	.027	----	-.054	-.128	-.212	-.132	.057	----	-.042	-.086	-.116	-.062	.065	----
5.50	-.078	----	----	----	----	----	-.058	----	----	----	----	----	-.050	----	----	----	----	----
6.50	-.089	-.160	-.349	-.292	-.051	.252	-.067	-.133	-.254	-.180	.000	.188	-.061	-.108	-.147	-.097	.016	.124
8.50	-.066	-.156	-.337	-.311	-.062	.213	-.050	-.123	-.233	-.199	-.035	.150	-.049	-.105	-.155	-.117	-.013	.096
10.50	-.054	-.155	-.309	-.317	-.084	.188	-.045	-.115	-.226	-.209	-.053	.125	-.045	-.096	-.157	-.129	-.029	.075
12.50	-.054	-.145	-.268	-.318	-.098	.166	-.059	-.105	-.208	-.212	-.068	.110	-.054	-.082	-.147	-.132	-.040	.061
14.50	-.069	-.141	-.255	-.324	-.113	.152	-.044	-.102	-.195	-.222	-.086	.078	-.052	-.080	-.148	-.142	-.055	.056
16.50	-.067	-.129	-.196	-.312	-.119	.129	-.059	-.091	-.165	-.217	-.090	.079	-.022	-.069	-.152	-.158	-.058	.057
17.17	-.070	----	----	----	----	----	-.041	----	----	----	----	----	-.023	----	----	----	----	----
18.17	-.070	-.116	-.169	-.305	-.124	.121	-.042	-.079	-.144	-.209	-.094	.072	-.021	-.058	-.120	-.135	-.061	.032
19.17	-.055	----	----	----	----	----	-.026	----	----	----	----	----	-.006	----	----	----	----	----
20.17	-.065	-.107	-.141	-.286	-.110	.130	-.038	-.066	-.113	-.191	-.085	.085	-.014	-.043	-.099	-.122	-.048	.044
21.17	-.051	----	-.151	-.271	-.101	----	-.050	----	-.122	-.179	-.072	----	-.006	----	-.108	-.115	-.040	----
22.17	-.044	-.101	-.139	-.266	-.100	.136	-.026	-.060	-.110	-.170	-.069	.091	-.005	-.040	-.094	-.104	-.037	.052
23.17	-.059	----	-.128	-.259	-.097	----	-.024	----	-.094	-.168	-.066	----	-.004	----	-.087	-.100	-.035	----
24.17	-.052	-.095	----	-.254	-.087	.137	-.019	-.054	----	-.164	-.059	.091	-.004	-.055	----	-.098	-.028	.052
25.17	-.055	----	----	-.254	-.090	----	-.022	----	----	-.163	-.060	----	-.007	----	-.075	-.099	-.050	----
26.17	----	-.091	----	-.245	----	.137	----	-.052	----	-.154	----	.090	----	-.055	----	-.092	----	.055
27.17	-.028	----	-.111	-.250	-.082	----	-.017	----	-.085	-.155	-.051	----	-.007	----	----	-.095	-.023	----
28.17	-.029	-.091	-.099	-.249	----	.138	-.020	-.048	-.063	-.155	----	.091	-.009	-.052	----	-.097	----	.055
29.17	-.035	----	----	-.251	----	----	-.019	----	----	-.157	----	----	-.012	----	----	-.098	----	----
30.17	-.055	-.086	----	-.243	-.085	.142	-.017	-.044	----	-.152	-.054	.095	-.008	-.029	----	-.094	-.028	.057
31.17	-.051	----	-.095	-.239	-.082	----	-.015	----	-.056	-.147	-.048	----	-.006	----	----	-.092	-.024	----
32.17	-.059	-.086	-.095	-.241	-.092	.140	-.018	-.042	-.050	-.146	-.055	.093	-.011	-.028	----	-.092	-.027	.057
33.17	-.039	----	----	----	----	----	-.017	----	----	----	----	----	-.009	----	----	----	----	----
34.17	-.040	-.082	-.095	-.238	-.095	.140	-.013	-.058	-.047	-.142	-.056	.092	-.006	-.027	-.051	-.092	-.032	.056
35.17	-.042	----	----	----	----	----	-.015	----	----	----	----	----	-.007	----	----	----	----	----
36.17	-.045	-.085	-.092	-.240	-.087	.148	-.015	-.059	-.048	-.141	-.048	.098	-.005	-.051	-.054	-.092	-.027	.061
37.17	-.051	----	----	----	----	----	-.020	----	----	----	----	----	-.007	----	----	----	----	----
38.15	-.057	-.090	-.098	-.252	-.107	.116	-.024	-.047	-.057	-.150	-.064	.068	-.011	-.041	-.065	-.109	-.045	.054
38.40	-.063	----	----	----	----	----	-.027	----	----	----	----	----	-.013	----	----	----	----	----
38.65	-.073	----	----	----	----	----	-.059	----	----	----	----	----	-.022	----	----	----	----	----
38.90	-.096	----	----	----	----	----	-.059	----	----	----	----	----	-.041	----	----	----	----	----
39.15	-.173	-.139	-.131	-.275	-.231	-.055	-.150	-.095	-.092	-.200	-.182	-.077	-.109	-.085	-.108	-.180	-.167	-.106
	α = 8°						α = 4°						α = 0°					
0.50	0.105	----	----	----	----	----	0.155	----	----	----	----	----	0.209					
1.50	.024	----	----	----	----	----	.066	----	----	----	----	----	.112					
2.50	.000	-0.014	-0.006	0.044	0.120	0.187	.054	0.041	0.056	0.075	0.105	0.130	.069					
3.50	-.007	----	----	----	----	----	.021	----	----	----	----	----	.047					
4.50	-.025	-.058	-.042	-.009	----	----	.000	.000	.005	.028	.049	.073	.025					
5.50	-.037	----	----	----	----	----	-.015	----	----	----	----	----	.006					
6.50	-.049	-.066	-.075	-.042	.010	.072	-.033	-.033	-.027	-.007	.013	.051	-.010					
8.50	-.047	-.069	-.084	-.061	-.005	.053	-.056	-.042	-.039	-.025	-.009	.010	-.015					
10.50	-.046	-.068	-.088	-.070	-.020	.055	-.041	-.046	-.045	-.035	-.017	.001	-.025					
12.50	-.058	-.060	-.082	-.075	-.027	.028	-.056	-.042	-.043	-.035	-.021	-.005	-.026					
14.50	-.058	-.059	-.086	-.085	-.041	.006	-.041	-.047	-.050	-.045	-.031	-.022	-.055					
16.50	-.024	-.048	-.075	-.079	-.041	.009	-.052	-.040	-.043	-.042	-.029	-.015	-.030					
17.17	-.022	----	----	----	----	----	-.050	----	----	----	----	----	-.028					
18.17	-.018	-.037	-.066	-.076	-.059	.009	-.025	-.051	-.056	-.057	-.028	-.015	-.025					
19.17	-.002	----	----	----	----	----	-.015	----	----	----	----	----	-.014					
20.17	-.006	-.022	-.049	-.060	-.028	.025	-.011	-.015	-.025	-.026	-.018	-.001	-.013					
21.17	.005	----	-.056	-.051	-.016	----	-.008	----	-.032	-.017	-.009	----	-.008					
22.17	.008	-.015	-.041	-.045	-.015	.035	.000	-.011	-.016	-.012	-.006	.010	-.002					
23.17	.013	----	-.059	-.043	-.011	----	.002	----	-.013	-.010	-.002	----	.002					
24.17	.015	-.009	----	-.041	-.007	.034	.005	-.006	-.013	-.008	-.002	.012	.004					
25.17	.013	----	-.050	-.040	-.006	----	.005	----	----	-.008	.001	----	.002					
26.17	----	-.006	----	-.035	----	.056	----	-.005	----	-.007	----	.011	----					
27.17	.017	----	----	-.054	.000	----	.004	----	-.012	-.009	.004	----	.005					
28.17	.016	-.005	----	-.055	----	.040	.005	-.002	----	-.006	----	.014	.004					
29.17	.015	----	----	-.056	----	----	.004	----	----	-.007	----	----	.005					
30.17	.018	-.001	----	-.054	.000	.044	.006	.001	----	-.006	.005	.018	.006					
31.17	.018	----	----	-.051	.005	----	.006	----	----	-.004	.005	----	.005					
32.17	.016	.000	----	-.029	.002	.046	.005	-.001	----	-.005	.005	.016	.004					
33.17	.017	----	----	----	----	----	.006	----	----	----	----	----	.004					
34.17	.020	.005	-.008	-.029	.002	.046	.006	.000	-.005	-.004	.005	.016	.007					
35.17	.017	----	----	----	----	----	.004	----	----	----	----	----	.004					
36.17	.019	.005	-.010	-.029	.005	.051	.004	-.005	-.006	-.006	.004	.018	.005					
37.17	.015	----	----	----	----	----	.000	----	----	----	----	----	.000					
38.15	.012	-.006	-.019	-.041	-.007	.029	-.007	-.015	-.019	-.022	-.012	-.004	-.011					
38.40	.010	----	----	----	----	----	-.011	----	----	----	----	----	-.015					
38.65	.001	----	----	----	----	----	-.018	----	----	----	----	----	-.027					
38.90	-.016	----	----	----	----	----	-.050	----	----	----	----	----	-.044					
39.15	-.071	-.043	-.067	-.114	-.116	-.095	-.058	-.053	-.077	-.105	-.110	-.110	-.072					

TABLE I.- Continued

PRESSURE DATA, CYLINDRICAL BODY

(d) M = 0.90

x, in.	Pressure coefficients of row -																	
	$\theta = 0^\circ$	$\theta = 45^\circ$	$\theta = 75^\circ$	$\theta = 105^\circ$	$\theta = 135^\circ$	$\theta = 180^\circ$	$\theta = 0^\circ$	$\theta = 45^\circ$	$\theta = 75^\circ$	$\theta = 105^\circ$	$\theta = 135^\circ$	$\theta = 180^\circ$	$\theta = 0^\circ$	$\theta = 45^\circ$	$\theta = 75^\circ$	$\theta = 105^\circ$	$\theta = 135^\circ$	$\theta = 180^\circ$
	$\alpha = 20^\circ$						$\alpha = 16^\circ$						$\alpha = 12^\circ$					
0.50	0.019	------	------	------	------	------	0.047	------	------	------	------	------	0.076	------	------	------	------	------
1.50	-.034	------	------	------	------	------	-.007	------	------	------	------	------	.002	------	------	------	------	------
2.50	-.051	-0.218	-0.288	-0.186	0.120	0.407	-.028	-0.113	-0.163	-0.068	0.141	0.334	-.013	-0.063	-0.076	-0.002	0.136	0.259
3.50	-.058	------	------	------	------	------	-.039	------	------	------	------	------	-.018	------	------	------	------	------
4.50	-.074	-.158	-.340	-.253	.036	------	-.053	-.126	-.210	-.189	.061	------	-.041	-.083	-.113	-.056	.067	------
5.50	-.081	------	------	------	------	------	-.060	------	------	------	------	------	-.050	------	------	------	------	------
6.50	-.091	-.164	-.355	-.294	-.030	.253	-.070	-.136	-.256	-.182	-.002	.187	-.063	-.108	-.147	-.097	.016	.128
8.50	-.069	-.162	-.342	-.316	-.064	.214	-.055	-.126	-.239	-.204	-.054	.150	-.052	-.106	-.157	-.120	-.013	.093
10.50	-.059	-.162	-.314	-.323	-.086	.183	-.049	-.120	-.230	-.215	-.059	.122	-.048	-.100	-.158	-.130	-.052	.073
12.50	-.060	-.153	-.268	-.327	-.103	.164	-.042	-.108	-.211	-.219	-.073	.106	-.058	-.083	-.149	-.133	-.042	.058
14.50	-.074	-.149	-.236	-.329	-.121	.127	-.049	-.107	-.198	-.230	-.091	.072	-.058	-.083	-.151	-.147	-.058	.053
16.50	-.071	-.136	-.193	-.318	-.129	.123	-.043	-.096	-.169	-.223	-.097	.073	-.027	-.073	-.136	-.142	-.062	.053
17.17	-.073	------	------	------	------	------	-.045	------	------	------	------	------	-.025	------	------	------	------	------
18.17	-.073	-.123	-.169	-.310	-.134	.116	-.044	-.083	-.144	-.214	-.100	.066	-.022	-.061	-.121	-.135	-.062	.028
19.17	-.059	------	------	------	------	------	-.028	------	------	------	------	------	-.007	------	------	------	------	------
20.17	-.067	-.110	-.136	-.286	-.116	.129	-.042	-.068	-.111	-.196	-.083	.080	-.016	-.045	-.100	-.121	-.050	.044
21.17	-.055	------	-.145	-.264	-.099	------	-.054	------	-.120	-.183	-.076	------	-.008	------	-.109	-.111	-.040	------
22.17	-.047	-.103	-.134	-.262	-.099	.133	-.027	-.062	-.107	-.172	-.073	.087	-.003	-.038	-.092	-.101	-.057	.053
23.17	-.040	------	-.123	-.260	-.097	------	-.026	------	-.094	-.168	-.070	------	-.004	------	-.083	-.101	-.053	------
24.17	-.053	-.095	------	-.253	-.086	.138	-.022	-.056	------	-.165	-.061	.089	-.004	-.035	------	-.097	-.028	.053
25.17	-.053	------	------	-.253	-.088	------	-.024	------	------	-.164	-.063	------	-.007	------	-.070	-.097	-.029	------
26.17	------	-.095	------	-.247	------	.136	------	-.053	------	-.159	------	.088	------	-.033	------	-.090	------	.052
27.17	-.028	------	-.110	-.247	-.082	------	-.019	------	-.082	-.158	-.054	------	-.007	------	------	-.090	-.022	------
28.17	-.030	-.093	-.099	-.242	------	.138	-.021	-.050	-.063	-.159	------	.090	-.009	-.032	------	-.093	------	.055
29.17	-.033	------	------	-.249	------	------	-.021	------	------	-.161	------	------	-.012	------	------	-.098	------	------
30.17	-.030	-.088	------	-.242	-.084	.142	-.019	-.047	------	-.153	-.058	.093	-.007	-.028	------	-.093	-.028	.058
31.17	-.032	------	-.097	-.234	-.079	------	-.015	------	-.056	-.147	-.051	------	-.008	------	------	-.089	-.024	------
32.17	-.038	-.088	-.093	-.238	-.088	.140	-.019	-.046	-.053	-.148	-.056	.092	-.011	-.029	------	-.089	-.028	.057
33.17	-.039	------	------	------	------	------	-.019	------	------	------	------	------	-.009	------	------	------	------	------
34.17	-.034	-.084	-.093	-.240	-.093	.138	-.016	-.040	-.049	-.145	-.058	.092	-.006	-.028	-.050	-.090	-.029	.057
35.17	-.043	------	------	------	------	------	-.015	------	------	------	------	------	-.007	------	------	------	------	------
36.17	-.045	-.086	-.093	-.242	-.088	.146	-.014	-.042	-.050	-.145	-.052	.097	-.006	-.031	-.054	-.090	-.026	.063
37.17	-.049	------	------	------	------	------	-.022	------	------	------	------	------	-.010	------	------	------	------	------
38.15	-.053	-.097	-.106	-.253	-.129	.116	-.024	-.050	-.060	-.157	-.067	.068	-.013	-.043	-.068	-.110	-.043	.033
38.40	-.058	------	------	------	------	------	-.029	------	------	------	------	------	-.017	------	------	------	------	------
38.65	-.069	------	------	------	------	------	-.038	------	------	------	------	------	-.023	------	------	------	------	------
38.90	-.090	------	------	------	------	------	-.055	------	------	------	------	------	-.040	------	------	------	------	------
39.15	-.162	-.145	-.136	-.286	-.266	-.040	-.126	-.102	-.097	-.213	-.200	-.083	-.111	-.091	-.111	-.193	-.180	-.111
	$\alpha = 8^\circ$						$\alpha = 4^\circ$						$\alpha = 0^\circ$					
0.50	0.115	------	------	------	------	------	0.166	------	------	------	------	------	0.221					
1.50	.032	------	------	------	------	------	.073	------	------	------	------	------	.120					
2.50	.004	-0.006	0.001	0.050	0.126	0.194	.040	0.048	0.064	0.079	0.109	0.136	.073					
3.50	-.004	------	------	------	------	------	.024	------	------	------	------	------	.051					
4.50	-.023	-.033	-.059	-.003	.062	------	.000	.004	.010	.027	.051	.076	.028					
5.50	-.036	------	------	------	------	------	-.016	------	------	------	------	------	.007					
6.50	-.052	-.068	-.076	-.040	.011	.072	-.036	-.035	-.028	-.012	.012	.031	-.012					
8.50	-.050	-.069	-.087	-.059	-.003	.052	-.039	-.043	-.040	-.030	-.010	.007	-.015					
10.50	-.049	-.071	-.090	-.070	-.024	.033	-.044	-.048	-.047	-.038	-.021	-.002	-.028					
12.50	-.041	-.060	-.084	-.074	-.029	.023	-.040	-.043	-.044	-.038	-.024	-.006	-.028					
14.50	-.043	-.061	-.091	-.087	-.043	.003	-.046	-.049	-.054	-.051	-.056	-.026	-.040					
16.50	-.031	-.051	-.079	-.081	-.042	.007	-.035	-.041	-.045	-.045	-.033	-.018	-.033					
17.17	-.026	------	------	------	------	------	-.033	------	------	------	------	------	-.031					
18.17	-.021	-.038	-.069	-.077	-.041	.005	-.028	-.032	-.037	-.040	-.030	-.018	-.029					
19.17	-.006	------	------	------	------	------	-.016	------	------	------	------	------	-.015					
20.17	-.009	-.021	-.051	-.062	-.029	.020	-.013	-.015	-.024	-.027	-.019	-.002	-.014					
21.17	.000	------	-.060	-.053	-.019	------	-.009	------	-.033	-.019	-.010	------	-.010					
22.17	.006	-.017	-.043	-.046	-.017	.050	-.003	-.011	-.014	-.013	-.007	.011	-.002					
23.17	.010	------	-.040	-.043	-.015	------	.001	------	-.013	-.010	-.004	------	.002					
24.17	.012	-.012	------	-.040	-.010	.033	.002	-.004	-.013	-.009	-.002	.013	.003					
25.17	.011	------	-.031	-.040	-.008	------	.002	------	------	-.008	.000	------	.002					
26.17	------	-.008	------	-.035	------	.032	------	-.002	------	-.006	------	.010	------					
27.17	.015	------	------	-.036	-.002	------	.003	------	-.014	-.008	.003	------	.003					
28.17	.013	-.007	------	-.037	------	.056	.003	-.001	------	-.007	------	.013	.004					
29.17	.012	------	------	-.038	------	------	.002	------	------	-.008	------	------	.003					
30.17	.013	-.004	------	-.034	-.003	.040	.003	.002	------	-.007	.001	.016	.007					
31.17	.015	------	------	.032	.000	------	.003	------	------	-.003	.004	------	.004					
32.17	.011	-.002	------	-.031	-.003	.041	.002	.001	------	-.004	.003	.014	.003					
33.17	.013	------	------	------	------	------	.003	------	------	------	------	------	.003					
34.17	.013	.002	-.013	-.029	-.003	.041	.003	.001	-.003	-.006	.003	.013	.006					
35.17	.015	------	------	------	------	------	.003	------	------	------	------	------	.002					
36.17	.017	.000	-.014	-.029	.002	.047	.003	-.003	-.007	-.009	.003	.017	.003					
37.17	.012	------	------	------	------	------	-.001	------	------	------	------	------	-.002					
38.15	.007	-.010	-.023	-.043	-.012	.023	-.010	-.018	-.021	-.026	-.014	-.006	-.015					
38.40	.005	------	------	------	------	------	-.015	------	------	------	------	------	-.021					
38.65	-.002	------	------	------	------	------	-.021	------	------	------	------	------	-.033					
38.90	-.019	------	------	------	------	------	-.035	------	------	------	------	------	-.049					
39.15	-.078	-.050	-.076	-.127	-.152	-.109	-.062	-.057	-.082	-.112	-.122	-.119	-.079					

TABLE I.- Continued

PRESSURE DATA, CYLINDRICAL BODY

(e) M = 0.95

x, in.	Pressure coefficients of row -																	
	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°
	α = 20°						α = 16°						α = 12°					
0.50	0.041	—	—	—	—	—	0.062	—	—	—	—	—	0.094	—	—	—	—	—
1.50	-.021	—	—	—	—	—	.000	—	—	—	—	—	.013	—	—	—	—	—
2.50	-.040	-0.200	-0.278	-0.170	0.134	0.421	-.022	-0.107	-0.153	-0.057	0.151	0.342	-.006	-0.056	-0.066	0.007	0.146	0.266
3.50	-.052	—	—	—	—	—	-.038	—	—	—	—	—	-.012	—	—	—	—	—
4.50	-.069	-.155	-.331	-.244	.046	—	-.056	-.123	-.207	-.119	.067	—	-.058	-.081	-.108	-.050	.073	—
5.50	-.080	—	—	—	—	—	-.065	—	—	—	—	—	-.052	—	—	—	—	—
6.50	-.097	-.170	-.359	-.294	-.024	.257	-.079	-.140	-.240	-.184	.000	.187	-.068	-.115	-.152	-.096	.018	.128
8.50	-.079	-.169	-.350	-.316	-.065	.215	-.065	-.134	-.245	-.208	-.057	.148	-.059	-.112	-.163	-.121	-.016	.093
10.50	-.066	-.168	-.317	-.341	-.096	.180	-.061	-.127	-.258	-.226	-.065	.117	-.056	-.106	-.165	-.137	-.057	.069
12.50	-.062	-.160	-.266	-.345	-.108	.157	-.053	-.116	-.215	-.226	-.080	.098	-.044	-.092	-.154	-.139	-.048	.054
14.50	-.082	-.156	-.238	-.357	-.126	.122	-.062	-.117	-.206	-.242	-.102	.066	-.046	-.093	-.160	-.157	-.069	.025
16.50	-.072	-.142	-.194	-.342	-.134	.119	-.053	-.102	-.173	-.233	-.106	.066	-.052	-.080	-.143	-.149	-.069	.026
17.17	-.078	—	—	—	—	—	-.055	—	—	—	—	—	-.050	—	—	—	—	—
18.17	-.076	-.127	-.166	-.326	-.139	.108	-.052	-.088	-.147	-.223	-.108	.058	-.027	-.068	-.127	-.143	-.070	.025
19.17	-.061	—	—	—	—	—	-.055	—	—	—	—	—	-.010	—	—	—	—	—
20.17	-.068	-.113	-.134	-.299	-.119	.123	-.053	-.071	-.111	-.201	-.090	.075	-.020	-.047	-.101	-.124	-.053	.040
21.17	-.064	—	-.150	-.269	-.108	—	-.041	—	-.122	-.179	-.078	—	-.010	—	-.112	-.112	-.042	—
22.17	-.046	-.107	-.136	-.263	-.104	.130	-.053	-.064	-.104	-.169	-.078	.085	-.006	-.042	-.092	-.101	-.038	.049
23.17	-.042	—	-.123	-.263	-.099	—	-.032	—	-.091	-.169	-.072	—	-.006	—	-.085	-.101	-.035	—
24.17	-.058	-.098	—	-.258	-.092	.134	-.028	-.057	—	-.166	-.063	.088	-.004	-.056	—	-.097	-.030	.053
25.17	-.037	—	—	-.259	-.096	—	-.051	—	—	-.164	-.066	—	-.009	—	-.070	-.098	-.050	—
26.17	—	-.096	—	-.248	—	.131	—	-.055	—	-.158	—	.086	—	-.054	—	-.092	—	.051
27.17	-.029	—	-.117	-.258	-.084	—	-.025	—	-.085	-.153	-.054	—	-.010	—	—	-.089	-.022	—
28.17	-.051	-.096	-.105	-.259	—	.133	-.026	-.053	-.067	-.161	—	.089	-.012	-.054	—	-.095	—	.055
29.17	-.055	—	—	-.256	—	—	-.029	—	—	-.161	—	—	-.014	—	—	-.097	—	—
30.17	-.053	-.091	—	-.246	-.091	.156	-.024	-.050	—	-.157	-.057	.090	-.010	-.050	—	-.093	-.028	.056
31.17	-.051	—	-.100	-.246	-.084	—	-.021	—	-.059	-.151	-.054	—	-.010	—	—	-.091	-.026	—
32.17	-.058	-.092	-.101	-.246	-.097	.134	-.025	-.050	-.057	-.151	-.060	.088	-.015	-.052	—	-.092	-.030	.056
33.17	-.040	—	—	—	—	—	-.025	—	—	—	—	—	-.013	—	—	—	—	—
34.17	-.058	-.090	-.099	-.246	-.100	.137	-.023	-.043	-.055	-.147	-.061	.089	-.010	-.051	-.052	-.092	-.031	.055
35.17	-.044	—	—	—	—	—	-.017	—	—	—	—	—	-.014	—	—	—	—	—
36.17	-.045	-.092	-.102	-.252	-.093	.142	-.015	-.047	-.058	-.148	-.053	.093	-.011	-.054	-.056	-.094	-.029	.063
37.17	-.051	—	—	—	—	—	-.025	—	—	—	—	—	-.016	—	—	—	—	—
38.15	-.057	-.104	-.118	-.267	-.112	.112	-.027	-.058	-.072	-.165	-.069	.069	-.020	-.052	-.073	-.112	-.045	.059
38.40	-.059	—	—	—	—	—	-.028	—	—	—	—	—	-.022	—	—	—	—	—
38.65	-.064	—	—	—	—	—	-.035	—	—	—	—	—	-.030	—	—	—	—	—
38.90	-.080	—	—	—	—	—	-.048	—	—	—	—	—	-.045	—	—	—	—	—
39.15	-.159	-.159	-.146	-.562	-.251	-.029	-.102	-.115	-.114	-.267	-.202	-.065	-.101	-.102	-.130	-.227	-.178	-.092
	α = 8°						α = 4°						α = 0°					
0.50	0.131	—	—	—	—	—	0.180	—	—	—	—	—	0.255					
1.50	.042	—	—	—	—	—	.061	—	—	—	—	—	.131					
2.50	.011	0.000	0.008	0.056	0.135	0.201	.048	0.053	0.071	0.086	0.117	0.142	.082					
3.50	.002	—	—	—	—	—	.025	—	—	—	—	—	.057					
4.50	-.021	-.032	-.056	-.001	.067	—	.001	.006	.011	.050	.053	.078	.054					
5.50	-.058	—	—	—	—	—	-.018	—	—	—	—	—	.009					
6.50	-.058	-.072	-.079	-.044	.010	.071	-.041	-.057	-.032	-.014	.011	.029	-.015					
8.50	-.056	-.077	-.092	-.065	-.010	.048	-.045	-.048	-.047	-.035	-.014	.006	-.019					
10.50	-.059	-.080	-.098	-.079	-.029	.027	-.054	-.057	-.055	-.039	-.026	-.007	-.055					
12.50	-.050	-.069	-.092	-.080	-.034	.019	-.047	-.050	-.051	-.044	-.028	-.011	-.034					
14.50	-.053	-.074	-.101	-.096	-.056	-.009	-.056	-.061	-.064	-.059	-.049	-.036	-.047					
16.50	-.039	-.061	-.090	-.090	-.052	-.002	-.046	-.050	-.055	-.052	-.042	-.026	-.059					
17.17	-.035	—	—	—	—	—	-.044	—	—	—	—	—	-.058					
18.17	-.029	-.047	-.079	-.085	-.051	-.004	-.058	-.058	-.046	-.047	-.058	-.025	-.054					
19.17	-.011	—	—	—	—	—	-.022	—	—	—	—	—	-.020					
20.17	-.013	-.028	-.057	-.066	-.054	.015	-.018	-.017	-.026	-.029	-.023	-.005	-.018					
21.17	-.005	—	-.065	-.055	-.025	—	-.014	—	-.036	-.021	-.011	—	-.013					
22.17	.005	-.020	-.048	-.048	-.018	.027	-.006	-.012	-.016	-.012	-.006	.007	-.005					
23.17	.007	—	-.044	-.045	-.016	—	-.001	—	-.014	-.012	-.004	—	.000					
24.17	.009	-.016	—	-.044	-.012	.030	-.001	-.004	-.013	-.011	-.002	.011	.002					
25.17	.007	—	-.056	-.044	-.011	—	-.001	—	—	-.008	.000	—	.002					
26.17	—	-.015	—	-.058	—	.050	—	-.004	—	-.006	—	.010	—					
27.17	.008	—	—	-.057	-.006	—	-.001	—	-.017	-.007	-.001	—	.001					
28.17	.008	-.014	—	-.040	—	.053	-.001	-.004	—	-.007	—	.013	.002					
29.17	.006	—	—	-.042	—	—	-.001	—	—	-.008	—	—	.002					
30.17	.011	-.010	—	-.058	-.008	.036	.002	-.001	—	-.008	-.001	.014	.006					
31.17	.009	—	—	-.055	-.005	—	-.001	—	—	-.005	.003	—	.002					
32.17	.005	-.010	—	-.054	-.006	.036	-.001	-.004	—	-.006	.002	.015	.001					
33.17	.005	—	—	—	—	—	.000	—	—	—	—	—	.002					
34.17	.010	-.008	-.019	-.055	-.007	.038	.002	-.005	-.007	-.008	.001	.013	.004					
35.17	.005	—	—	—	—	—	.002	—	—	—	—	—	.001					
36.17	.006	-.010	-.022	-.036	-.004	.043	-.001	-.006	-.010	-.012	.001	.015	.001					
37.17	.001	—	—	—	—	—	-.006	—	—	—	—	—	-.006					
38.15	-.005	-.024	-.057	-.052	-.017	.022	-.017	-.026	-.051	-.050	-.016	-.006	-.020					
38.40	-.007	—	—	—	—	—	-.020	—	—	—	—	—	-.027					
38.65	-.016	—	—	—	—	—	-.030	—	—	—	—	—	-.040					
38.90	-.050	—	—	—	—	—	-.044	—	—	—	—	—	-.061					
39.15	-.090	-.066	-.099	-.161	-.150	-.105	-.071	-.068	-.102	-.134	-.141	-.136	-.095					

TABLE I.- Continued

PRESSURE DATA, CYLINDRICAL BODY

(f) $M = 0.98$

Pressure coefficients of row -

$\alpha = 20^\circ$

x, in.	$\theta = 0^\circ$	$\theta = 45^\circ$	$\theta = 75^\circ$	$\theta = 105^\circ$	$\theta = 135^\circ$	$\theta = 180^\circ$
0.50	0.060	—	—	—	—	—
1.50	-.009	—	—	—	—	—
2.50	-.030	-0.185	-0.265	-0.154	0.150	0.433
3.50	-.044	—	—	—	—	—
4.50	-.062	-.141	-.319	-.236	.058	—
5.50	-.078	—	—	—	—	—
6.50	-.099	-.169	-.348	-.296	-.017	.261
8.50	-.080	-.168	-.355	-.329	-.062	.214
10.50	-.082	-.184	-.339	-.342	-.095	.180
12.50	-.060	-.168	-.283	-.364	-.123	.149
14.50	-.103	-.172	-.240	-.356	-.137	.113
16.50	-.092	-.162	-.217	-.359	-.139	.112
17.17	-.092	—	—	—	—	—
18.17	-.079	-.123	-.165	-.348	-.163	.091
19.17	-.060	—	—	—	—	—
20.17	-.064	-.121	-.142	-.288	-.112	.124
21.17	-.036	—	-.136	-.303	-.111	—
22.17	-.035	-.107	-.132	-.246	-.108	.129
23.17	-.041	—	-.121	-.283	-.091	—
24.17	-.046	-.098	—	-.250	-.093	.136
25.17	-.048	—	—	-.266	-.090	—
26.17	—	-.097	—	-.250	—	.152
27.17	-.039	—	-.117	-.265	-.083	—
28.17	-.034	-.097	-.106	-.262	—	.134
29.17	-.040	—	—	-.261	—	—
30.17	-.039	-.094	—	-.252	-.091	.137
31.17	-.032	—	-.105	-.248	-.086	—
32.17	-.036	-.095	-.104	-.251	-.094	.135
33.17	-.037	—	—	—	—	—
34.17	-.039	-.093	-.102	-.246	-.100	.135
35.17	-.051	—	—	—	—	—
36.17	-.052	-.096	-.106	-.253	-.092	.142
37.17	-.059	—	—	—	—	—
38.15	-.066	-.114	-.125	-.267	-.111	.117
38.40	-.067	—	—	—	—	—
38.65	-.074	—	—	—	—	—
38.90	-.085	—	—	—	—	—
39.15	-.126	-.181	-.190	-.372	-.232	-.005

$\alpha = 16^\circ$

x, in.	$\theta = 0^\circ$	$\theta = 45^\circ$	$\theta = 75^\circ$	$\theta = 105^\circ$	$\theta = 135^\circ$	$\theta = 180^\circ$
0.50	0.088	—	—	—	—	—
1.50	.020	—	—	—	—	—
2.50	-.003	-0.095	-0.140	-0.059	0.167	0.356
3.50	-.023	—	—	—	—	—
4.50	-.043	-.117	-.197	-.111	.079	—
5.50	-.053	—	—	—	—	—
6.50	-.079	-.147	-.238	-.177	.006	.194
8.50	-.060	-.133	-.241	-.209	-.057	.149
10.50	-.074	-.146	-.259	-.244	-.071	.112
12.50	-.042	-.120	-.226	-.247	-.093	.091
14.50	-.080	-.158	-.221	-.242	-.106	.061
16.50	-.057	-.120	-.193	-.262	-.130	.049
17.17	-.047	—	—	—	—	—
18.17	-.048	-.090	-.130	-.226	-.127	.046
19.17	-.026	—	—	—	—	—
20.17	-.061	-.072	-.098	-.200	-.105	.072
21.17	-.040	—	-.119	-.186	-.071	—
22.17	-.026	-.063	-.094	-.166	-.075	.084
23.17	-.027	—	-.084	-.179	-.067	—
24.17	-.022	-.056	—	-.172	-.060	.090
25.17	-.024	—	—	-.167	-.062	—
26.17	—	-.054	—	-.161	—	.087
27.17	-.018	—	-.084	-.152	-.055	—
28.17	-.022	-.054	-.064	-.170	—	.088
29.17	-.024	—	—	-.169	—	—
30.17	-.019	-.049	—	-.159	-.057	.090
31.17	-.011	—	-.058	-.153	-.053	—
32.17	-.018	-.051	-.057	-.151	-.060	.089
33.17	-.022	—	—	—	—	—
34.17	-.017	-.045	-.054	-.148	-.059	.089
35.17	-.023	—	—	—	—	—
36.17	-.020	-.050	-.057	-.150	-.053	.097
37.17	-.033	—	—	—	—	—
38.15	-.041	-.067	-.075	-.161	-.064	.074
38.40	-.041	—	—	—	—	—
38.65	-.052	—	—	—	—	—
38.90	-.057	—	—	—	—	—
39.15	-.095	-.140	-.155	-.274	-.177	-.053

$\alpha = 12^\circ$

x, in.	$\theta = 0^\circ$	$\theta = 45^\circ$	$\theta = 75^\circ$	$\theta = 105^\circ$	$\theta = 135^\circ$	$\theta = 180^\circ$
0.50	0.111	—	—	—	—	—
1.50	.025	—	—	—	—	—
2.50	.003	-0.042	-0.053	0.022	0.155	0.276
3.50	-.005	—	—	—	—	—
4.50	-.032	-.072	-.098	-.044	.080	—
5.50	-.046	—	—	—	—	—
6.50	-.070	-.115	-.151	-.094	.018	.130
8.50	-.065	-.116	-.167	-.125	-.016	.092
10.50	-.065	-.116	-.178	-.149	-.047	.061
12.50	.047	-.095	-.161	-.144	-.054	.049
14.50	-.063	-.108	-.179	-.174	-.080	.013
16.50	-.043	-.089	-.152	-.162	-.080	.014
17.17	-.059	—	—	—	—	—
18.17	-.051	-.071	-.132	-.156	-.083	.011
19.17	-.008	—	—	—	—	—
20.17	-.021	-.047	-.100	-.127	-.056	.038
21.17	-.009	—	-.117	-.106	-.043	—
22.17	-.004	-.040	-.087	-.099	-.043	.050
23.17	-.005	—	-.081	-.098	-.056	—
24.17	-.004	-.055	—	-.097	-.050	.054
25.17	-.007	—	-.067	-.097	-.051	—
26.17	—	-.053	—	-.093	—	.051
27.17	-.011	—	—	-.085	-.025	—
28.17	-.012	-.034	—	-.097	—	.053
29.17	-.015	—	—	-.099	—	—
30.17	-.010	-.051	—	-.095	-.050	.056
31.17	-.011	—	—	-.093	-.028	—
32.17	-.017	-.052	—	-.094	-.031	.054
33.17	-.015	—	—	—	—	—
34.17	-.013	-.052	-.050	-.094	-.032	.055
35.17	-.016	—	—	—	—	—
36.17	-.013	-.056	-.057	-.096	-.029	.061
37.17	-.020	—	—	—	—	—
38.15	-.031	-.057	-.073	-.111	-.040	.040
38.40	-.054	—	—	—	—	—
38.65	-.042	—	—	—	—	—
38.90	-.052	—	—	—	—	—
39.15	-.097	-.126	-.169	-.229	-.157	-.066

$\alpha = 8^\circ$

x, in.	$\theta = 0^\circ$	$\theta = 45^\circ$	$\theta = 75^\circ$	$\theta = 105^\circ$	$\theta = 135^\circ$	$\theta = 180^\circ$
0.50	0.149	—	—	—	—	—
1.50	.034	—	—	—	—	—
2.50	.020	0.012	0.021	0.069	0.144	0.210
3.50	.010	—	—	—	—	—
4.50	-.014	-.022	-.027	.007	.073	—
5.50	-.033	—	—	—	—	—
6.50	-.059	-.072	-.078	-.038	.010	.073
8.50	-.060	-.078	-.094	-.070	-.009	.048
10.50	-.063	-.084	-.105	-.090	-.037	.021
12.50	-.052	-.069	-.091	-.087	-.043	.012
14.50	-.069	-.087	-.117	-.115	-.071	-.022
16.50	-.049	-.070	-.097	-.102	-.063	-.013
17.17	-.045	—	—	—	—	—
18.17	-.035	-.052	-.083	-.096	-.062	-.014
19.17	-.015	—	—	—	—	—
20.17	-.015	-.026	-.036	-.070	-.037	.014
21.17	-.002	—	-.067	-.058	-.024	—
22.17	.003	-.020	-.044	-.050	-.020	.026
23.17	.007	—	-.042	-.048	-.018	—
24.17	.009	-.016	—	-.047	-.015	.029
25.17	.008	—	-.034	-.046	-.014	—
26.17	—	-.014	—	-.041	—	.028
27.17	.006	—	—	-.038	-.008	—
28.17	.003	-.014	—	-.043	—	.031
29.18	.003	—	—	-.045	—	—
30.17	.008	-.011	—	-.043	-.012	.032
31.17	.004	—	—	-.040	-.009	—
32.17	.000	-.013	—	-.040	-.011	.031
33.17	.001	—	—	—	—	—
34.17	.003	-.012	-.023	-.041	-.012	.031
35.17	.000	—	—	—	—	—
36.17	.000	-.016	-.028	-.043	-.010	.037
37.17	-.008	—	—	—	—	—
38.15	-.022	-.037	-.047	-.058	-.021	.017
38.40	-.025	—	—	—	—	—
38.65	-.035	—	—	—	—	—
38.90	-.050	—	—	—	—	—
39.15	-.105	-.095	-.140	-.179	-.145	-.095

$\alpha = 4^\circ$

x, in.	$\theta = 0^\circ$	$\theta = 45^\circ$	$\theta = 75^\circ$	$\theta = 105^\circ$	$\theta = 135^\circ$	$\theta = 180^\circ$
0.50	0.199	—	—	—	—	—
1.50	.099	—	—	—	—	—
2.50	.062	0.065	0.081	0.096	0.126	0.153
3.50	.039	—	—	—	—	—
4.50	.012	.014	.018	.057	.062	.087
5.50	-.009	—	—	—	—	—
6.50	-.037	-.036	-.050	-.013	.011	.031
8.50	-.045	-.049	-.048	-.033	-.015	.001
10.50	-.052	-.060	-.059	-.048	-.033	-.014
12.50	-.045	-.049	-.051	-.043	-.032	-.015
14.50	-.067	-.073	-.079	-.076	-.062	-.032
16.50	-.049	-.056	-.061	-.060	-.048	-.034
17.17	-.046	—	—	—	—	—
18.17	-.037	-.044	-.051	-.033	-.044	-.032
19.17	-.018	—	—	—	—	—
20.17	-.016	-.018	-.028	-.030	-.026	-.006
21.17	-.008	—	-.037	-.022	-.014	—
22.17	.000	-.011	-.016	-.013	-.010	.008
23.17	.002	—	-.013	-.009	-.004	—
24.17	.004	-.004	-.012	-.008	-.002	.011
25.17	.004	—	—	-.008	-.002	—
26.17	—	-.003	—	-.005	—	.008
27.17	.004	—	-.016	-.009	.001	—
28.17	.004	-.003	—	-.010	—	.011
29.18	.003	—	—	-.011	—	—
30.17	.007	.001	—	-.009	-.002	.011
31.17	.013	—	—	-.007	.000	—
32.17	.002	-.002	—	-.007	.000	.011
33.17	.003	—	—	—	—	—
34.17	.003	-.002	-.006	-.008	-.001	.011
35.17	.001	—	—	—	—	—
36.17	-.001	-.009	-.012	-.011	-.002	.014
37.17	-.009	—	—	—	—	—
38.15	-.024	-.032	-.032	-.029	-.016	-.006
38.40	-.030	—	—	—	—	—
38.65	-.042	—	—	—	—	—
38.90	-.056	—	—	—	—	—
39.15	-.085	-.085	-.125	-.152	-.146	-.132

$\alpha = 0^\circ$

x, in.	$\theta = 0^\circ$	$\theta = 45^\circ$	$\theta = 75^\circ$	$\theta = 105^\circ$	$\theta = 135^\circ$	$\theta = 180^\circ$
0.50	0.253					
1.50	.145					
2.50	.094					
3.50	.065					
4.50	.042					
5.50	.014					
6.50	-.011					
8.50	-.020					
10.50	-.037					
12.50	-.033					
14.50	-.063					
16.50	-.047					
17.17	-.047					
18.17	-.040					
19.17	-.020					
20.17	-.018					
21.17	-.012					
22.17	-.002					
23.17	.002					
24.17	.002					
25.17	.003					
26.17	—					
27.17	.003					
28.17	.003					
29.18	.002					
30.17	.007					
31.17	.002					
32.17	.002					
33.17	.005					
34.17	.004					
35.17	.001					
36.17	.000					
37.17	-.007					
38.15	-.024					
38.40	-.033					
38.65	-.047					
38.90	-.074					
39.15	-.117					

TABLE I.- Continued

PRESSURE DATA, CYLINDRICAL BODY

(g) M = 1.00

x, in.	Pressure coefficients of row -																	
	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°
	α = 20°						α = 16°						α = 12°					
0.50	0.078	—	—	—	—	—	0.106	—	—	—	—	—	0.129	—	—	—	—	—
1.50	.007	—	—	—	—	—	.057	—	—	—	—	—	.040	—	—	—	—	—
2.50	-.018	-0.125	-0.259	-0.138	0.164	0.442	.011	-0.078	-0.127	-0.026	0.180	0.369	.015	-0.050	-0.041	0.034	0.170	0.289
3.50	-.054	—	—	—	—	—	-.009	—	—	—	—	—	.012	—	—	—	—	—
4.50	-.046	-.131	-.314	-.219	.073	—	-.026	-.097	-.174	-.100	.093	—	-.018	-.059	-.088	-.028	.093	—
5.50	-.067	—	—	—	—	—	-.047	—	—	—	—	—	-.034	—	—	—	—	—
6.50	-.091	-.165	-.352	-.279	-.005	.270	-.066	-.132	-.227	-.168	.015	.205	-.065	-.107	-.141	-.080	.026	.138
8.50	-.078	-.168	-.353	-.317	-.052	.219	-.059	-.131	-.241	-.205	-.030	.156	-.056	-.107	-.158	-.119	-.011	.097
10.50	-.082	-.184	-.338	-.350	-.093	.183	-.070	-.142	-.253	-.233	-.069	.119	-.070	-.117	-.177	-.146	-.043	.065
12.50	-.080	-.181	-.293	-.365	-.117	.150	-.066	-.136	-.239	-.251	-.095	.071	-.061	-.108	-.173	-.158	-.065	.043
14.50	-.115	-.187	-.265	-.378	-.146	.106	-.095	-.149	-.241	-.272	-.125	.050	-.075	-.118	-.189	-.182	-.088	.007
16.50	-.112	-.176	-.225	-.372	-.160	.099	-.081	-.141	-.212	-.273	-.138	.040	-.064	-.115	-.176	-.184	-.097	.003
17.17	-.122	—	—	—	—	—	-.096	—	—	—	—	—	-.067	—	—	—	—	—
18.17	-.113	-.170	-.205	-.370	-.168	.080	-.091	-.136	-.194	-.273	-.152	.024	-.065	-.108	-.169	-.189	-.109	-.012
19.17	-.105	—	—	—	—	—	-.067	—	—	—	—	—	-.042	—	—	—	—	—
20.17	-.084	-.138	-.164	-.347	-.159	.088	-.052	-.111	-.147	-.250	-.138	.058	-.057	-.072	-.134	-.165	-.096	.000
21.17	-.027	—	-.140	-.323	-.149	—	-.070	—	-.145	-.220	-.123	—	.001	—	-.116	-.133	-.079	—
22.17	-.006	-.078	-.081	-.275	-.138	.105	-.023	-.075	-.110	-.199	-.106	.054	.020	-.021	-.059	-.081	-.059	.046
23.17	-.028	—	-.086	-.193	-.072	—	.001	—	-.062	-.179	-.092	—	.019	—	-.056	-.069	-.011	—
24.17	-.037	-.086	—	-.236	-.056	.161	.007	-.054	—	-.117	-.040	.099	.016	-.020	—	-.074	-.007	.077
25.17	-.028	—	—	-.218	-.070	—	.001	—	—	-.126	-.052	—	.007	—	-.050	-.077	-.014	—
26.17	—	-.086	—	-.233	—	.148	—	-.058	—	-.128	—	.115	—	-.024	—	-.076	—	.066
27.17	-.036	—	-.103	-.251	-.072	—	-.006	—	-.061	-.131	-.051	—	-.004	—	—	-.072	-.014	—
28.17	-.026	-.084	-.096	-.244	—	.140	-.010	-.047	-.057	-.157	—	.107	-.008	-.030	—	-.100	—	.061
29.17	-.038	—	—	-.256	—	—	-.018	—	—	-.156	—	—	-.012	—	—	-.096	—	—
30.17	-.033	-.079	—	-.239	-.087	.137	-.016	-.044	—	-.151	-.053	.097	-.008	-.028	—	-.096	-.051	.058
31.17	-.032	—	-.087	-.235	-.078	—	-.012	—	-.062	-.152	-.051	—	-.004	—	—	-.091	-.025	—
32.17	-.044	-.080	-.085	-.232	-.067	.136	-.009	-.048	-.062	-.154	-.058	.089	-.015	-.032	—	-.095	-.052	.057
33.17	-.055	—	—	—	—	—	-.018	—	—	—	—	—	-.015	—	—	—	—	—
34.17	-.048	-.080	-.086	-.226	-.090	.138	-.012	-.047	-.058	-.153	-.065	.085	-.008	-.050	-.049	-.091	-.053	.057
35.17	-.053	—	—	—	—	—	-.018	—	—	—	—	—	-.014	—	—	—	—	—
36.17	-.054	-.082	-.087	-.230	-.080	.146	-.016	-.048	-.058	-.150	-.054	.093	-.011	-.054	-.054	-.092	-.026	.065
37.17	-.063	—	—	—	—	—	-.028	—	—	—	—	—	-.018	—	—	—	—	—
38.15	-.077	-.103	-.106	-.240	-.091	.126	-.042	-.067	-.070	-.155	-.059	.081	-.035	-.057	-.070	-.105	-.035	.048
38.40	-.085	—	—	—	—	—	-.045	—	—	—	—	—	-.038	—	—	—	—	—
38.65	-.095	—	—	—	—	—	-.061	—	—	—	—	—	-.056	—	—	—	—	—
38.90	-.109	—	—	—	—	—	-.082	—	—	—	—	—	-.076	—	—	—	—	—
39.15	-.145	-.214	-.220	-.347	-.201	.018	-.119	-.185	-.195	-.260	-.156	-.009	-.119	-.171	-.201	-.214	-.135	-.042

x, in.	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°
	α = 8°						α = 4°						α = 0°
0.50	0.162	—	—	—	—	—	0.211	—	—	—	—	—	0.226
1.50	.068	—	—	—	—	—	.108	—	—	—	—	—	.158
2.50	.052	0.022	0.033	0.082	0.155	0.221	.072	0.076	0.090	0.106	0.138	0.164	.104
3.50	.023	—	—	—	—	—	.046	—	—	—	—	—	.077
4.50	-.002	-.013	-.016	.016	.083	—	.020	.022	.028	.046	.073	.097	.053
5.50	-.024	—	—	—	—	—	-.005	—	—	—	—	—	.025
6.50	-.051	-.065	-.072	-.058	.016	.078	-.034	-.053	-.027	-.008	.018	.058	-.006
8.50	-.050	-.071	-.087	-.063	-.005	.051	-.038	-.041	-.042	-.027	-.009	.009	-.014
10.50	-.071	-.093	-.109	-.092	-.040	.018	-.063	-.070	-.068	-.053	-.038	-.018	-.045
12.50	-.067	-.086	-.109	-.102	-.055	.001	-.065	-.068	-.069	-.060	-.047	-.029	-.050
14.50	-.079	-.100	-.127	-.125	-.079	-.050	-.080	-.084	-.088	-.082	-.069	-.057	-.069
16.50	-.072	-.094	-.120	-.124	-.082	-.051	-.075	-.080	-.084	-.080	-.070	-.053	-.065
17.17	-.073	—	—	—	—	—	-.077	—	—	—	—	—	-.070
18.17	-.066	-.086	-.118	-.127	-.090	-.040	-.075	-.078	-.086	-.083	-.074	-.056	-.068
19.17	-.043	—	—	—	—	—	-.057	—	—	—	—	—	-.051
20.17	-.028	-.041	-.078	-.100	-.074	-.023	-.043	-.045	-.057	-.062	-.059	-.042	-.039
21.17	.007	—	-.062	-.059	-.057	—	-.021	—	-.053	-.055	-.031	—	-.001
22.17	.022	-.006	-.026	-.057	-.008	.040	.014	.004	-.001	.004	.006	.022	.020
23.17	.024	—	-.025	-.030	.000	—	.020	—	.006	.013	.019	—	.021
24.17	.024	-.004	—	-.051	-.001	.043	.019	.011	.005	.010	.016	.051	.017
25.17	.019	—	-.024	-.055	-.003	—	.016	—	—	.007	.014	—	.013
26.17	—	-.009	—	-.056	—	.034	—	.003	—	.003	—	.020	—
27.17	.012	—	—	-.051	-.003	—	.006	—	-.012	.001	.008	—	.006
28.17	.008	-.013	—	-.043	—	.050	.004	-.003	—	-.006	—	.016	.006
29.17	.006	—	—	-.048	—	—	.001	—	—	-.009	—	—	.003
30.17	.009	-.012	—	-.044	-.014	.031	.004	-.002	—	-.008	-.001	.013	.010
31.17	.007	—	—	-.042	-.011	—	-.002	—	—	-.007	.000	—	.002
32.17	.002	-.013	—	-.042	-.014	.029	-.002	-.003	—	-.007	.000	.012	.002
33.17	.003	—	—	—	—	—	.000	—	—	—	—	—	.004
34.17	.003	-.011	-.023	-.041	-.014	.028	.003	-.003	-.007	-.007	.001	.013	.007
35.17	.000	—	—	—	—	—	.001	—	—	—	—	—	.002
36.17	-.001	-.016	-.027	-.043	-.011	.035	-.001	-.007	-.011	-.009	.001	.016	.002
37.17	-.010	—	—	—	—	—	-.008	—	—	—	—	—	-.003
38.15	-.027	-.041	-.047	-.055	-.019	.020	-.028	-.035	-.053	-.025	-.010	.000	-.019
38.40	-.035	—	—	—	—	—	-.057	—	—	—	—	—	-.029
38.65	-.050	—	—	—	—	—	-.052	—	—	—	—	—	-.046
38.90	-.071	—	—	—	—	—	-.078	—	—	—	—	—	-.079
39.15	-.124	-.137	-.173	-.176	-.129	-.078	-.122	-.125	-.156	-.159	-.139	-.115	-.147

TABLE I.- Continued

PRESSURE DATA, CYLINDRICAL BODY

(b) $M = 1.03$

x, in.	Pressure coefficients of row - $\theta = 0^\circ$	$\theta = 45^\circ$	$\theta = 75^\circ$	$\theta = 105^\circ$	$\theta = 135^\circ$	$\theta = 180^\circ$	$\theta = 0^\circ$	$\theta = 45^\circ$	$\theta = 75^\circ$	$\theta = 105^\circ$	$\theta = 135^\circ$	$\theta = 180^\circ$	$\theta = 0^\circ$	$\theta = 45^\circ$	$\theta = 75^\circ$	$\theta = 105^\circ$	$\theta = 135^\circ$	$\theta = 180^\circ$
	$\alpha = 20^\circ$						$\alpha = 16^\circ$						$\alpha = 12^\circ$					
0.50	0.110	-----	-----	-----	-----	-----	0.127	-----	-----	-----	-----	-----	0.158	-----	-----	-----	-----	-----
1.50	.041	-----	-----	-----	-----	-----	.058	-----	-----	-----	-----	-----	.072	-----	-----	-----	-----	-----
2.50	.017	-0.090	-0.218	-0.103	0.197	0.467	.040	-0.057	-0.106	0.000	0.200	0.388	.046	0.001	-0.009	0.065	0.197	0.316
3.50	.003	-----	-----	-----	-----	-----	.021	-----	-----	-----	-----	-----	.044	-----	-----	-----	-----	-----
4.50	-.012	-.095	-.274	-.179	.110	-----	.011	-.063	-.142	-.065	.119	-----	.015	-.025	-.052	.005	.122	-----
5.50	-.028	-----	-----	-----	-----	-----	-.008	-----	-----	-----	-----	-----	-.007	-----	-----	-----	-----	-----
6.50	-.053	-.124	-.305	-.236	.036	.302	-.029	-.094	-.186	-.127	.052	.233	-.027	-.070	-.104	-.049	.055	.166
8.50	-.051	-.135	-.316	-.275	-.014	.251	-.022	-.093	-.199	-.162	.008	.188	-.029	-.077	-.127	-.087	.021	.184
10.50	-.057	-.155	-.308	-.314	-.057	.214	-.040	-.107	-.214	-.194	-.051	.151	-.045	-.092	-.150	-.118	-.014	.095
12.50	-.065	-.160	-.273	-.335	-.085	.176	-.046	-.112	-.213	-.219	-.065	.118	-.044	-.089	-.155	-.138	-.040	.064
14.50	-.101	-.176	-.254	-.357	-.121	.127	-.081	-.133	-.225	-.250	-.101	.070	-.063	-.107	-.175	-.167	-.074	.025
16.50	-.121	-.175	-.226	-.365	-.144	.113	-.082	-.137	-.209	-.262	-.124	.055	-.059	-.108	-.171	-.176	-.090	.015
17.17	-.122	-----	-----	-----	-----	-----	-.096	-----	-----	-----	-----	-----	-.068	-----	-----	-----	-----	-----
18.17	-.125	-.176	-.217	-.371	-.162	.086	-.095	-.139	-.197	-.272	-.142	.050	-.070	-.110	-.171	-.186	-.105	-.007
19.17	-.125	-----	-----	-----	-----	-----	-.088	-----	-----	-----	-----	-----	-.057	-----	-----	-----	-----	-----
20.17	-.116	-.166	-.192	-.371	-.166	.086	-.084	-.129	-.173	-.267	-.146	.050	-.075	-.096	-.155	-.180	-.106	-.005
21.17	-.107	-----	-.191	-.355	-.163	-----	-.076	-----	-.176	-.252	-.138	-----	-.078	-----	-.160	-.162	-.094	-----
22.17	-.106	-.159	-.179	-.352	-.162	.083	-.071	-.119	-.156	-.242	-.135	.033	-.045	-.091	-.144	-.154	-.088	.005
23.17	-.094	-----	-.164	-.313	-.157	-----	-.078	-----	-.138	-.231	-.134	-----	-.043	-----	-.132	-.155	-.087	-----
24.17	-.085	-.143	-----	-.310	-.122	.087	-.067	-.107	-----	-.219	-.118	.058	-.041	-.076	-----	-.149	-.080	.012
25.17	-.073	-----	-----	-.311	-.138	-----	-.060	-----	-----	-.216	-.112	-----	-.045	-----	-.105	-.139	-.077	-----
26.17	-----	-.128	-----	-.285	-----	.099	-----	-.096	-----	-.199	-----	.049	-----	-.071	-----	-.132	-----	.014
27.17	-.064	-----	-.135	-.291	-.113	-----	-.060	-----	-.113	-.198	-.092	-----	-.035	-----	-----	-.122	-.065	-----
28.17	-.064	-.124	-.125	-.278	-----	.106	-.054	-.091	-.099	-.205	-----	.057	-.033	-.062	-----	-.130	-----	.027
29.17	-.068	-----	-----	-.278	-----	-----	-.060	-----	-----	-.201	-----	-----	-.036	-----	-----	-.128	-----	-----
30.17	-.062	-.112	-----	-.267	-.124	.109	-.050	-.081	-----	-.191	-.098	.057	-.025	-.049	-----	-.122	-.059	.054
31.17	-.064	-----	-.111	-.253	-.104	-----	-.054	-----	-.087	-.180	-.085	-----	.000	-----	-----	-.111	-.050	-----
32.17	-.061	-.102	-.107	-.252	-.110	.112	-.038	-.075	-.081	-.178	-.087	.060	-.021	-.043	-----	-.107	-.050	.054
33.17	-.053	-----	-----	-----	-----	-----	-.041	-----	-----	-----	-----	-----	-.021	-----	-----	-----	-----	-----
34.17	-.053	-.090	-.095	-.239	-.107	.118	-.029	-.058	-.069	-.167	-.083	.067	-.003	-.027	-.044	-.094	-.042	.044
35.17	-.054	-----	-----	-----	-----	-----	-.018	-----	-----	-----	-----	-----	.016	-----	-----	-----	-----	-----
36.17	-.043	-.076	-.078	-.222	-.085	.138	.000	-.039	-.047	-.143	-.060	.087	.057	.004	-.009	-.055	-.005	.080
37.17	-.030	-----	-----	-----	-----	-----	-.013	-----	-----	-----	-----	-----	.053	-----	-----	-----	-----	-----
38.15	-.037	-.068	-.073	-.208	-.073	.134	-.011	-.041	-.046	-.131	-.044	.091	.018	-.008	-.018	-.050	.014	.093
38.40	-.053	-----	-----	-----	-----	-----	-.015	-----	-----	-----	-----	-----	.014	-----	-----	-----	-----	-----
38.65	-.033	-----	-----	-----	-----	-----	-.023	-----	-----	-----	-----	-----	-.005	-----	-----	-----	-----	-----
38.90	-.050	-----	-----	-----	-----	-----	-.028	-----	-----	-----	-----	-----	-.021	-----	-----	-----	-----	-----
39.15	-.056	-.135	-.156	-.287	-.159	.052	-.057	-.121	-.129	-.219	-.122	.022	-.062	-.113	-.140	-.161	-.085	.005
	$\alpha = 8^\circ$						$\alpha = 4^\circ$						$\alpha = 0^\circ$					
0.50	0.186	-----	-----	-----	-----	-----	0.236	-----	-----	-----	-----	-----	0.288					
1.50	.091	-----	-----	-----	-----	-----	.135	-----	-----	-----	-----	-----	.180					
2.50	.058	0.050	0.058	0.105	0.179	0.242	.101	0.103	0.118	0.133	0.162	0.188	.131					
3.50	.052	-----	-----	-----	-----	-----	.078	-----	-----	-----	-----	-----	.107					
4.50	.033	.025	.019	.052	.115	-----	.057	.056	.060	.079	.102	.128	.083					
5.50	.015	-----	-----	-----	-----	-----	.036	-----	-----	-----	-----	-----	.059					
6.50	-.014	-.028	-.053	.001	.054	.112	.008	.006	.012	.031	.053	.070	.031					
8.50	-.018	-.057	-.052	-.027	.029	.083	-.003	-.009	-.008	.005	.024	.042	.019					
10.50	-.044	-.065	-.083	-.062	-.012	.046	-.033	-.039	-.058	-.025	-.007	.012	-.018					
12.50	-.052	-.070	-.094	-.085	-.037	.021	-.043	-.048	-.050	-.042	-.028	-.009	-.038					
14.50	-.070	-.090	-.118	-.114	-.067	-.017	-.064	-.071	-.073	-.070	-.056	-.043	-.064					
16.50	-.070	-.091	-.117	-.119	-.078	-.026	-.066	-.073	-.079	-.076	-.063	-.048	-.063					
17.17	-.073	-----	-----	-----	-----	-----	-.069	-----	-----	-----	-----	-----	-.072					
18.17	-.072	-.090	-.120	-.127	-.089	-.040	-.071	-.076	-.083	-.083	-.073	-.058	-.072					
19.17	-.060	-----	-----	-----	-----	-----	-.061	-----	-----	-----	-----	-----	-.063					
20.17	-.063	-.074	-.108	-.119	-.086	-.054	-.060	-.063	-.074	-.076	-.069	-.050	-.062					
21.17	-.057	-----	-.114	-.100	-.075	-----	-.059	-----	-.082	-.060	-.057	-----	-.060					
22.17	-.046	-.072	-.099	-.103	-.067	-.020	-.049	-.064	-.068	-.064	-.054	-.037	-.050					
23.17	-.040	-----	-.095	-.098	-.071	-----	-.042	-----	-.059	-.055	-.051	-----	-.040					
24.17	-.033	-.059	-----	-.095	-.061	-.014	-.037	-.049	-.059	-.054	-.045	-.029	-.041					
25.17	-.031	-----	-.075	-.093	-.062	-----	-.033	-----	-----	-.051	-.045	-----	-.041					
26.17	-----	-.051	-----	-.080	-----	-.016	-----	-.036	-----	-.040	-----	-.032	-----					
27.17	-.022	-----	-----	-.067	-.047	-----	-.031	-----	-.050	-.037	-.031	-----	-.029					
28.17	-.020	-.045	-----	-.076	-----	.003	-.028	-.037	-----	-.040	-----	-.019	-.021					
29.17	-.023	-----	-----	-.076	-----	-----	-.023	-----	-----	-.040	-----	-----	-.027					
30.17	-.015	-.038	-----	-.072	-.044	.006	-.014	-.023	-----	-.036	-.031	-.013	-.015					
31.17	-.015	-----	-----	-.062	-.035	-----	-.017	-----	-----	-.030	-.023	-----	-.020					
32.17	-.014	-.028	-----	-.058	-.034	.010	-.011	-.017	-----	-.023	-.020	-.010	-.014					
33.17	-.003	-----	-----	-----	-----	-----	-.004	-----	-----	-----	-----	-----	-.005					
34.17	.018	-.002	-.013	-.039	-.017	.022	.006	.000	-.005	-.008	-.005	.006	.014					
35.17	.050	-----	-----	-----	-----	-----	.017	-----	-----	-----	-----	-----	.053					
36.17	.040	.023	.015	-.002	.030	.073	.032	.023	.019	.021	.029	.039	.050					
37.17	.038	-----	-----	-----	-----	-----	.036	-----	-----	-----	-----	-----	.053					
38.15	.029	.012	.008	.000	.035	.073	.023	.018	.019	.027	.039	.046	.037					
38.40	.022	-----	-----	-----	-----	-----	.017	-----	-----	-----	-----	-----	.026					
38.65	.009	-----	-----	-----	-----	-----	.005	-----	-----	-----	-----	-----	.008					
38.90	-.010	-----	-----	-----	-----	-----	-.017	-----	-----	-----	-----	-----	-.024					
39.15	-.061	-.069	-.104	-.119	-.074	-.024	-.057	-.053	-.087	-.102	-.083	-.067	-.086					

TABLE I.- Continued

PRESSURE DATA, CYLINDRICAL BODY

(i) M = 1.08

x, in.	Pressure coefficients of row -																	
	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°
	α = 20°						α = 16°						α = 12°					
0.50	0.112	—	—	—	—	—	0.122	—	—	—	—	—	0.124	—	—	—	—	—
1.50	.045	—	—	—	—	—	.046	—	—	—	—	—	.063	—	—	—	—	—
2.50	.001	-0.097	-0.228	-0.099	0.205	0.471	.017	-0.069	-0.104	0.000	0.202	0.384	.037	-0.004	-0.013	0.062	0.197	0.317
3.50	-.005	—	—	—	—	—	.020	—	—	—	—	—	.049	—	—	—	—	—
4.50	-.019	-.105	-.280	-.174	.113	—	.006	-.065	-.144	-.066	.123	—	.026	-.017	-.046	.009	.128	—
5.50	-.025	—	—	—	—	—	-.015	—	—	—	—	—	.000	—	—	—	—	—
6.50	-.039	-.114	-.303	-.237	.039	.303	-.033	-.097	-.186	-.124	.056	.234	-.025	-.062	-.096	-.043	.060	.169
8.50	-.058	-.139	-.316	-.269	-.010	.253	-.034	-.107	-.225	-.177	.001	.184	-.031	-.078	-.126	-.084	.027	.128
10.50	-.089	-.175	-.326	-.318	-.053	.214	-.057	-.114	-.212	-.210	-.048	.137	-.052	-.085	-.152	-.117	-.009	.098
12.50	-.071	-.157	-.270	-.354	-.092	.172	-.048	-.108	-.202	-.205	-.053	.127	-.045	-.087	-.150	-.141	-.047	.063
14.50	-.063	-.156	-.207	-.363	-.114	.138	-.054	-.111	-.219	-.248	-.085	.089	-.077	-.115	-.178	-.164	-.068	.027
16.50	-.072	-.150	-.170	-.322	-.129	.123	-.044	-.102	-.160	-.248	-.111	.073	-.032	-.083	-.151	-.165	-.082	.016
17.17	-.072	—	—	—	—	—	-.052	—	—	—	—	—	-.057	—	—	—	—	—
18.17	-.085	-.139	-.162	-.329	-.130	.117	-.051	-.100	-.146	-.229	-.115	.047	-.033	-.077	-.132	-.147	-.080	.023
19.17	-.087	—	—	—	—	—	-.046	—	—	—	—	—	-.016	—	—	—	—	—
20.17	-.072	-.122	-.143	-.308	-.120	.125	-.044	-.089	-.119	-.220	-.108	.062	-.017	-.053	-.108	-.144	-.073	.027
21.17	-.067	—	-.144	-.294	-.112	—	-.045	—	-.123	-.205	-.100	—	-.028	—	-.109	-.122	-.064	—
22.17	-.041	-.101	-.128	-.306	-.111	.124	-.040	-.085	-.111	-.192	-.094	.065	-.007	-.043	-.085	-.105	-.050	.037
23.17	-.039	—	-.109	-.266	-.111	—	-.038	—	-.099	-.182	-.089	—	.023	—	-.062	-.093	-.034	—
24.17	-.059	-.094	—	-.255	-.096	.125	-.038	-.075	—	-.176	-.071	.076	.033	-.007	—	-.084	-.026	.055
25.17	-.065	—	—	-.249	-.096	—	-.039	—	—	-.181	-.074	—	.021	—	-.031	-.062	-.022	—
26.17	—	-.104	—	-.241	—	.151	—	.002	—	-.156	—	.089	—	-.021	—	-.059	—	.064
27.17	-.060	—	-.110	-.249	-.079	—	.054	—	.001	-.062	.005	—	-.013	—	—	-.071	-.001	—
28.17	-.056	-.100	-.098	-.242	—	.135	.013	-.012	.019	-.087	—	.163	-.025	-.041	—	-.093	—	.083
29.17	-.049	—	—	-.235	—	—	-.023	—	—	-.140	—	—	-.043	—	—	-.101	—	—
30.17	-.010	-.061	—	-.205	-.053	.174	-.054	-.053	—	-.157	-.046	.119	-.040	-.036	—	-.100	-.033	.050
31.17	-.019	—	-.071	-.207	-.017	—	-.068	—	-.076	-.169	-.059	—	-.009	—	—	-.075	-.001	—
32.17	-.038	-.068	-.078	-.234	-.052	.189	-.061	-.076	-.087	-.184	-.085	.072	-.015	-.022	—	-.074	.007	.108
33.17	-.049	—	—	—	—	—	-.068	—	—	—	—	—	-.011	—	—	—	—	—
34.17	-.058	-.087	-.100	-.258	-.099	.145	-.065	-.080	-.094	-.188	-.098	.054	-.015	-.052	-.064	-.114	-.045	.056
35.17	-.070	—	—	—	—	—	-.062	—	—	—	—	—	-.029	—	—	—	—	—
36.17	-.082	-.109	-.114	-.274	-.111	.128	-.069	-.088	-.097	-.193	-.095	.063	-.032	-.050	-.077	-.126	-.060	.038
37.17	-.092	—	—	—	—	—	-.071	—	—	—	—	—	-.045	—	—	—	—	—
38.15	-.100	-.126	-.124	-.275	-.126	.097	-.075	-.096	-.101	-.196	-.101	.042	-.048	-.071	-.086	-.139	-.073	.008
38.40	-.099	—	—	—	—	—	-.075	—	—	—	—	—	-.048	—	—	—	—	—
38.65	-.103	—	—	—	—	—	-.079	—	—	—	—	—	-.052	—	—	—	—	—
38.90	-.111	—	—	—	—	—	-.081	—	—	—	—	—	-.062	—	—	—	—	—
39.15	-.124	-.226	-.252	-.314	-.171	.060	-.098	-.204	-.209	-.243	-.143	.007	-.088	-.184	-.189	-.185	-.115	-.025
	α = 8°						α = 4°						α = 0°					
0.50	0.152	—	—	—	—	—	0.206	—	—	—	—	—	0.246					
1.50	.082	—	—	—	—	—	.107	—	—	—	—	—	.169					
2.50	.048	0.039	0.046	0.095	0.173	0.241	.082	0.088	0.100	0.114	0.149	0.177	.111					
3.50	.051	—	—	—	—	—	.061	—	—	—	—	—	.090					
4.50	.031	.020	.012	.051	.112	—	.058	.056	.060	.077	.099	.124	.074					
5.50	.004	—	—	—	—	—	.033	—	—	—	—	—	.051					
6.50	-.017	-.030	-.039	-.009	.030	.108	.007	.006	.013	.030	.030	.067	.026					
8.50	-.025	-.043	-.059	-.036	.018	.074	-.009	-.015	-.015	.001	.016	.032	.012					
10.50	-.040	-.059	-.075	-.057	-.006	.047	-.028	-.034	-.034	-.021	-.006	.009	-.009					
12.50	-.055	-.079	-.106	-.094	-.038	.024	-.041	-.050	-.053	-.059	-.018	.005	-.018					
14.50	-.065	-.080	-.107	-.110	-.071	-.020	-.054	-.060	-.069	-.072	-.062	-.045	-.062					
16.50	-.056	-.073	-.094	-.091	-.047	-.004	-.066	-.070	-.069	-.065	-.056	-.039	-.029					
17.17	-.058	—	—	—	—	—	-.066	—	—	—	—	—	-.027					
18.17	-.042	-.065	-.107	-.106	-.061	-.004	-.056	-.064	-.068	-.057	-.056	-.016	-.057					
19.17	-.024	—	—	—	—	—	-.025	—	—	—	—	—	-.042					
20.17	-.026	-.056	-.070	-.091	-.065	-.009	-.021	-.026	-.040	-.050	-.053	-.031	-.046					
21.17	-.017	—	-.073	-.066	-.047	—	-.020	—	-.044	-.027	-.031	—	-.017					
22.17	-.004	-.051	-.059	-.067	-.037	.004	-.011	-.020	-.024	-.019	-.011	-.001	-.008					
23.17	.004	—	-.052	-.060	-.037	—	.001	—	-.013	-.013	-.011	—	-.001					
24.17	.008	-.020	—	-.056	-.029	.014	.008	-.002	-.013	-.013	-.009	.003	.002					
25.17	.010	—	-.055	-.052	-.024	—	.016	—	—	-.009	-.005	—	.005					
26.17	—	-.007	—	-.039	—	.018	—	.024	—	.008	—	.006	—					
27.17	.035	—	—	-.023	-.005	—	.041	—	.013	.017	.019	—	.031					
28.17	.044	.019	—	-.006	—	.068	.023	.016	—	.017	—	.056	.041					
29.17	.038	—	—	.002	—	—	.010	—	—	.040	—	—	.059					
30.17	.031	.009	—	-.006	.036	.086	.019	.014	—	.028	.050	.081	.061					
31.17	.011	—	—	-.030	.009	—	.014	—	—	.006	.021	—	.017					
32.17	-.011	-.023	—	-.051	-.018	.051	.004	-.002	—	-.010	-.003	.009	-.006					
33.17	-.023	—	—	—	—	—	-.003	—	—	—	—	—	-.021					
34.17	-.023	-.059	-.054	-.076	-.047	-.003	-.012	-.021	-.051	-.057	-.034	-.022	-.026					
35.17	-.033	—	—	—	—	—	-.024	—	—	—	—	—	-.033					
36.17	-.033	-.049	-.063	-.083	-.050	.000	-.028	-.034	-.039	-.042	-.056	-.021	-.032					
37.17	-.041	—	—	—	—	—	-.034	—	—	—	—	—	-.034					
38.15	-.048	-.062	-.072	-.089	-.054	-.017	-.042	-.051	-.052	-.051	-.040	-.052	-.037					
38.40	-.043	—	—	—	—	—	-.050	—	—	—	—	—	-.039					
38.65	-.057	—	—	—	—	—	-.062	—	—	—	—	—	-.049					
38.90	-.073	—	—	—	—	—	-.088	—	—	—	—	—	-.072					
39.15	-.103	-.172	-.176	-.152	-.109	-.038	-.146	-.136	-.136	-.134	-.111	-.091	-.148					

TABLE I.- Continued

PRESSURE DATA, CYLINDRICAL BODY

(j) M = 1.10

x, in.	α = 20°, θ = 0°	α = 20°, θ = 45°	α = 20°, θ = 75°	α = 20°, θ = 105°	α = 20°, θ = 135°	α = 20°, θ = 180°	α = 16°, θ = 0°	α = 16°, θ = 45°	α = 16°, θ = 75°	α = 16°, θ = 105°	α = 16°, θ = 135°	α = 16°, θ = 180°	α = 12°, θ = 0°	α = 12°, θ = 45°	α = 12°, θ = 75°	α = 12°, θ = 105°	α = 12°, θ = 135°	α = 12°, θ = 180°
0.50	0.097	------	------	------	------	------	0.119	------	------	------	------	------	0.117	------	------	------	------	------
1.50	.038	------	------	------	------	------	.051	------	------	------	------	------	.045	------	------	------	------	------
2.50	.006	-0.092	-0.227	-0.089	0.215	0.476	.020	-0.068	-0.098	0.001	0.205	0.390	.010	-0.023	-0.051	0.045	0.175	0.290
3.50	.008	------	------	------	------	------	.024	------	------	------	------	------	.041	------	------	------	------	------
4.50	-.012	-.097	-.261	-.161	.123	------	.008	-.062	-.142	-.066	.125	------	.025	-.017	-.045	.006	.125	------
5.50	-.038	------	------	------	------	------	-.014	------	------	------	------	------	.002	------	------	------	------	------
6.50	-.058	-.131	-.310	-.227	.051	.311	-.051	-.095	-.187	-.127	.055	.254	-.017	-.057	-.093	-.041	.066	.177
8.50	-.042	-.131	-.307	-.271	.002	.260	-.029	-.094	-.201	-.161	.011	.187	-.025	-.069	-.118	-.079	.027	.129
10.50	-.074	-.160	-.307	-.307	-.048	.218	-.043	-.119	-.233	-.198	-.022	.157	-.048	-.089	-.146	-.112	-.010	.096
12.50	-.090	-.172	-.289	-.332	-.073	.181	-.053	-.112	-.217	-.246	-.077	.110	-.027	-.078	-.155	-.131	-.028	.074
14.50	-.091	-.167	-.246	-.373	-.117	.133	-.083	-.140	-.221	-.245	-.110	.062	-.058	-.096	-.158	-.159	-.071	.035
16.50	-.093	-.160	-.183	-.374	-.139	.119	-.065	-.122	-.193	-.235	-.097	.065	-.069	-.111	-.170	-.168	-.077	.021
17.17	-.090	------	------	------	------	------	-.068	------	------	------	------	------	-.054	------	------	------	------	------
18.17	-.090	-.155	-.163	-.314	-.153	.096	-.056	-.104	-.166	-.256	-.110	.066	-.049	-.092	-.165	-.186	-.102	.000
19.17	-.090	------	------	------	------	------	-.049	------	------	------	------	------	-.037	------	------	------	------	------
20.17	-.071	-.138	-.145	-.315	-.118	.112	-.045	-.090	-.125	-.235	-.129	.051	-.024	-.070	-.121	-.159	-.103	.001
21.17	-.089	------	-.145	-.302	-.114	------	-.047	------	-.124	-.210	-.114	------	-.032	------	-.119	-.132	-.082	------
22.17	-.079	-.123	-.138	-.313	-.118	.119	-.048	-.083	-.105	-.200	-.094	.059	-.022	-.065	-.104	-.120	-.065	.015
23.17	-.067	------	-.127	-.267	-.116	------	-.033	------	-.087	-.177	-.088	------	-.014	------	-.094	-.113	-.048	------
24.17	-.069	-.110	------	-.263	-.099	.123	-.028	-.069	------	-.171	-.069	.077	-.014	-.049	------	-.111	-.041	.046
25.17	-.044	------	------	-.269	-.087	------	-.038	------	------	-.178	-.076	------	-.016	------	-.071	-.111	-.044	------
26.17	------	-.080	------	-.258	------	.132	------	-.067	------	-.167	------	.076	------	-.043	------	-.101	------	.040
27.17	-.029	------	-.093	-.258	-.086	------	-.040	------	-.087	-.168	-.064	------	-.051	------	------	-.093	-.032	------
28.17	-.027	-.075	-.082	-.236	------	.127	-.039	-.071	-.083	-.173	------	.080	.034	-.024	------	-.102	------	.052
29.17	-.034	------	------	-.246	------	------	-.040	------	------	-.179	------	------	.015	------	------	-.089	------	------
30.17	-.047	-.077	------	-.219	-.097	.122	-.051	-.055	------	-.181	-.079	.074	.009	-.005	------	-.089	-.028	.052
31.17	-.042	------	-.067	-.187	-.081	------	-.008	------	-.045	-.163	-.074	------	.013	------	------	-.061	-.027	------
32.17	-.052	-.083	-.071	-.177	-.059	.125	.033	.016	.005	-.133	-.068	.074	-.011	-.019	------	-.056	-.006	.055
33.17	-.066	------	------	------	------	------	.045	------	------	------	------	------	-.016	------	------	------	------	------
34.17	-.061	-.065	-.066	-.215	-.059	.164	.034	.005	.004	-.064	.060	.202	-.019	-.050	-.043	-.083	-.016	.080
35.17	-.028	------	------	------	------	------	-.006	------	------	------	------	------	-.017	------	------	------	------	------
36.17	-.013	-.037	-.052	-.179	------	.224	-.024	-.059	-.044	-.136	-.026	.139	-.023	-.026	-.042	-.074	-.004	.087
37.17	-.036	------	------	------	------	------	-.046	------	------	------	------	------	-.018	------	------	------	------	------
38.15	-.059	-.065	-.080	-.238	-.063	.164	-.057	-.065	-.077	-.174	-.075	.070	-.009	-.028	-.050	-.087	-.007	.088
38.40	-.058	------	------	------	------	------	-.057	------	------	------	------	------	-.011	------	------	------	------	------
38.65	-.064	------	------	------	------	------	-.062	------	------	------	------	------	-.019	------	------	------	------	------
38.90	-.075	------	------	------	------	------	-.066	------	------	------	------	------	-.031	------	------	------	------	------
39.15	-.094	-.181	-.200	-.290	-.132	.099	-.079	-.174	-.188	-.220	-.122	.028	-.057	-.149	-.161	-.156	-.074	.026

x, in.	α = 8°, θ = 0°	α = 8°, θ = 45°	α = 8°, θ = 75°	α = 8°, θ = 105°	α = 8°, θ = 135°	α = 8°, θ = 180°	α = 4°, θ = 0°	α = 4°, θ = 45°	α = 4°, θ = 75°	α = 4°, θ = 105°	α = 4°, θ = 135°	α = 4°, θ = 180°	α = 0°, θ = 0°
0.50	0.154	------	------	------	------	------	0.199	------	------	------	------	------	0.253
1.50	.066	------	------	------	------	------	.112	------	------	------	------	------	.156
2.50	.013	0.010	0.024	0.078	0.158	0.226	.049	0.063	0.081	0.099	0.152	0.161	.092
3.50	.045	------	------	------	------	------	.045	------	------	------	------	------	.114
4.50	.038	.027	.017	.034	.114	------	.061	.052	.053	.072	.098	.131	.083
5.50	.012	------	------	------	------	------	.038	------	------	------	------	------	.046
6.50	-.007	-.022	-.033	-.001	.059	.113	.013	.015	.020	.037	.057	.075	.022
8.50	-.022	-.040	-.037	-.035	.020	.077	-.005	-.010	-.009	.001	.019	.058	.013
10.50	-.040	-.059	-.078	-.058	-.009	.046	-.029	-.034	-.033	-.024	-.010	.009	-.014
12.50	-.036	-.051	-.073	-.065	-.025	.029	-.035	-.038	-.038	-.033	-.020	-.002	-.022
14.50	-.063	-.086	-.114	-.101	-.045	.013	-.049	-.060	-.063	-.054	-.031	-.016	-.022
16.50	-.053	-.073	-.102	-.113	-.076	-.020	-.050	-.056	-.066	-.074	-.061	-.040	-.061
17.17	-.062	------	------	------	------	------	-.057	------	------	------	------	------	-.071
18.17	-.067	-.082	-.111	-.115	-.085	-.036	-.068	-.071	-.072	-.074	-.067	-.055	-.065
19.17	-.057	------	------	------	------	------	-.066	------	------	------	------	------	-.046
20.17	-.060	-.067	-.104	-.103	-.065	-.017	-.059	-.063	-.070	-.063	-.052	-.039	-.044
21.17	-.029	------	-.099	-.089	-.056	------	-.037	------	-.070	-.051	-.045	------	-.041
22.17	-.012	-.041	-.069	-.082	-.048	.002	-.024	-.031	-.037	-.043	-.053	-.020	-.041
23.17	-.001	------	-.057	-.063	-.047	------	-.010	------	-.026	-.025	-.025	------	-.015
24.17	.003	-.027	------	-.060	-.053	.003	-.004	-.013	-.022	-.019	-.015	-.001	.001
25.17	.001	------	-.047	-.060	-.029	------	-.004	------	------	-.021	-.015	------	-.001
26.17	------	-.022	------	-.043	------	.024	------	-.008	------	-.017	------	-.001	------
27.17	.003	------	------	-.031	-.008	------	-.007	------	-.015	-.003	.000	------	.002
28.17	.003	-.017	------	-.042	------	.033	-.006	-.009	------	-.008	------	.018	.006
29.17	-.001	------	------	-.047	------	------	-.007	------	------	-.005	------	------	.001
30.17	-.003	-.024	------	-.051	-.019	.027	.001	-.004	------	-.009	-.001	.015	.006
31.17	-.002	------	------	-.052	-.020	------	.013	------	------	-.013	-.003	------	.000
32.17	.024	.003	------	-.054	-.025	.019	.052	.046	------	-.002	-.007	.004	.003
33.17	.059	------	------	------	------	------	.043	------	------	------	------	------	.056
34.17	.067	.042	.059	.042	.047	.068	.032	.025	.026	.032	.045	.063	.070
35.17	.049	------	------	------	------	------	.025	------	------	------	------	------	.064
36.17	.032	.016	.006	.000	.042	.103	.021	.018	.021	.030	.048	.070	.032
37.17	.007	------	------	------	------	------	.011	------	------	------	------	------	.003
38.15	-.012	-.026	-.033	-.049	-.017	.023	-.009	-.016	-.017	-.020	-.009	-.002	-.014
38.40	-.016	------	------	------	------	------	-.018	------	------	------	------	------	-.019
38.65	-.028	------	------	------	------	------	-.033	------	------	------	------	------	-.050
38.90	-.046	------	------	------	------	------	-.058	------	------	------	------	------	-.053
39.15	-.079	-.150	-.146	-.117	-.074	-.028	-.123	-.133	-.131	-.109	-.083	-.063	-.130

TABLE I.- Concluded

PRESSURE DATA, CYLINDRICAL BODY

(k) M = 1.13

x, in.	Pressure coefficients of row -																	
	α = 20°						α = 16°						α = 12°					
	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°
0.50	0.079	—	—	—	—	—	0.078	—	—	—	—	—	0.116	—	—	—	—	—
1.50	.025	—	—	—	—	—	.053	—	—	—	—	—	.057	—	—	—	—	—
2.50	.008	-0.096	-0.225	-0.080	0.219	0.473	.008	-0.081	-0.104	0.002	0.209	0.383	.019	-0.018	-0.026	0.050	0.182	0.300
3.50	.012	—	—	—	—	—	.029	—	—	—	—	—	.029	—	—	—	—	—
4.50	.005	-.085	-.250	-.147	.136	—	.013	-.056	-.133	-.055	.138	—	.013	-.018	-.040	.005	.121	—
5.50	-.016	—	—	—	—	—	-.004	—	—	—	—	—	.002	—	—	—	—	—
6.50	-.041	-.111	-.280	-.206	.069	.324	-.019	-.085	-.174	-.109	.077	.251	-.011	-.053	-.092	-.040	.069	.180
8.50	-.053	-.134	-.308	-.244	.021	.274	-.018	-.085	-.194	-.147	.030	.200	-.015	-.058	-.109	-.073	.033	.138
10.50	-.056	-.135	-.289	-.294	-.024	.251	-.054	-.097	-.208	-.182	-.012	.160	-.027	-.068	-.126	-.099	.002	.109
12.50	-.070	-.154	-.248	-.332	-.061	.196	-.059	-.097	-.188	-.196	-.040	.129	-.057	-.073	-.132	-.112	-.017	.087
14.50	-.099	-.170	-.258	-.336	-.106	.145	-.058	-.122	-.252	-.252	-.063	.105	-.052	-.078	-.150	-.131	-.043	.051
16.50	-.087	-.156	-.211	-.349	-.117	.129	-.072	-.117	-.179	-.265	-.109	.068	-.053	-.080	-.146	-.168	-.068	.046
17.17	-.092	—	—	—	—	—	-.081	—	—	—	—	—	-.050	—	—	—	—	—
18.17	-.094	-.146	-.173	-.368	-.136	.109	-.089	-.122	-.169	-.251	-.152	.041	-.065	-.095	-.147	-.154	-.089	.012
19.17	-.094	—	—	—	—	—	-.081	—	—	—	—	—	-.060	—	—	—	—	—
20.17	-.084	-.150	-.150	-.344	-.147	.105	-.066	-.115	-.161	-.228	-.106	.050	-.026	-.077	-.145	-.175	-.090	.009
21.17	-.095	—	-.148	-.308	-.147	—	-.068	—	-.161	-.235	-.100	—	-.025	—	-.128	-.154	-.090	—
22.17	-.095	-.143	-.139	-.320	-.144	.087	-.066	-.102	-.142	-.250	-.107	.055	-.027	-.069	-.112	-.145	-.076	.013
23.17	-.069	—	-.126	-.268	-.124	—	-.050	—	-.117	-.219	-.113	—	-.019	—	-.099	-.130	-.075	—
24.17	-.061	-.117	—	-.261	-.109	.105	-.042	-.082	—	-.201	-.093	.055	-.021	-.057	—	-.128	-.065	.014
25.17	-.071	—	—	-.263	-.085	—	-.041	—	—	-.189	-.093	—	-.027	—	-.080	-.129	-.068	—
26.17	—	-.104	—	-.251	—	.125	—	-.074	—	-.175	—	.062	—	-.054	—	-.114	—	.025
27.17	-.065	—	-.113	-.253	-.080	—	-.029	—	-.086	-.179	-.072	—	-.050	—	—	-.107	-.047	—
28.17	-.058	-.102	-.111	-.248	—	.125	-.036	-.071	-.077	-.167	—	.068	-.025	-.047	—	-.107	—	.037
29.17	-.058	—	—	-.263	—	—	-.041	—	—	-.166	—	—	-.040	—	—	-.102	—	—
30.17	-.063	-.090	—	-.250	-.087	.125	-.040	-.063	—	-.155	-.057	.088	-.036	-.050	—	-.102	-.034	.045
31.17	-.050	—	-.096	-.253	-.078	—	-.050	—	-.068	-.151	-.041	—	-.061	—	—	-.102	-.028	—
32.17	-.053	-.085	-.093	-.259	-.080	.139	-.046	-.087	-.072	-.157	-.056	.094	-.017	-.047	—	-.109	-.042	.051
33.17	-.043	—	—	—	—	—	-.041	—	—	—	—	—	-.059	—	—	—	—	—
34.17	-.043	-.074	-.081	-.243	-.100	.126	-.046	-.066	-.082	-.178	-.071	.076	-.018	-.055	-.060	-.118	-.041	.052
35.17	-.043	—	—	—	—	—	-.044	—	—	—	—	—	-.007	—	—	—	—	—
36.17	-.028	-.057	-.058	-.213	-.091	.127	-.051	-.062	-.082	-.180	-.081	.073	.005	-.012	-.053	-.093	-.057	.059
37.17	-.034	—	—	—	—	—	-.056	—	—	—	—	—	.005	—	—	—	—	—
38.15	-.056	-.061	-.044	-.175	-.062	.121	-.055	-.065	-.069	-.161	-.082	.062	.012	-.015	-.020	-.053	-.038	.034
38.40	-.056	—	—	—	—	—	-.054	—	—	—	—	—	.022	—	—	—	—	—
38.65	-.057	—	—	—	—	—	-.035	—	—	—	—	—	.017	—	—	—	—	—
38.90	-.061	—	—	—	—	—	-.054	—	—	—	—	—	-.001	—	—	—	—	—
39.15	-.075	-.160	-.149	-.195	-.098	.102	-.057	-.154	-.160	-.188	-.102	.037	-.026	-.125	-.127	-.114	-.058	.013

x, in.	α = 8°						α = 4°						α = 0°
	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°	θ = 45°	θ = 75°	θ = 105°	θ = 135°	θ = 180°	θ = 0°
0.50	0.149	—	—	—	—	—	0.205	—	—	—	—	—	0.291
1.50	.089	—	—	—	—	—	.122	—	—	—	—	—	.182
2.50	.058	0.032	0.045	0.094	0.170	0.240	.079	0.088	0.105	0.115	0.145	0.172	.106
3.50	.054	—	—	—	—	—	.069	—	—	—	—	—	.088
4.50	.012	.012	.011	.053	.118	—	.042	.042	.048	.068	.095	.122	.067
5.50	.013	—	—	—	—	—	.014	—	—	—	—	—	.065
6.50	-.005	-.016	-.052	-.002	.059	.119	.016	.007	.008	.024	.044	.078	.046
8.50	-.013	-.051	-.049	-.022	.052	.088	.005	-.001	-.001	.014	.051	.050	.015
10.50	-.025	-.046	-.067	-.048	.002	.059	-.016	-.022	-.022	-.009	.009	.051	.000
12.50	-.050	-.048	-.073	-.063	-.019	.054	-.020	-.025	-.029	-.025	-.013	.005	-.015
14.50	-.059	-.053	-.082	-.078	-.056	.009	-.054	-.040	-.043	-.040	-.027	-.017	-.027
16.50	-.045	-.074	-.099	-.088	-.056	.010	-.057	-.047	-.047	-.057	-.020	-.017	-.025
17.17	-.056	—	—	—	—	—	-.045	—	—	—	—	—	-.018
18.17	-.052	-.069	-.113	-.117	-.071	-.016	-.046	-.062	-.077	-.073	-.051	-.020	-.044
19.17	-.058	—	—	—	—	—	-.057	—	—	—	—	—	-.056
20.17	-.049	-.057	-.090	-.108	-.081	-.051	-.046	-.043	-.051	-.056	-.055	-.046	-.061
21.17	-.041	—	-.087	-.073	-.062	—	-.051	—	-.062	-.045	-.050	—	-.044
22.17	-.042	-.067	-.091	-.077	-.045	-.008	-.046	-.057	-.055	-.041	-.028	-.026	-.024
23.17	-.022	—	-.093	-.088	-.050	—	-.027	—	-.057	-.046	-.033	—	-.025
24.17	-.016	-.043	—	-.091	-.053	-.005	-.017	-.028	-.047	-.049	-.059	-.019	-.054
25.17	-.015	—	-.061	-.084	-.056	—	-.019	—	—	-.059	-.040	—	-.042
26.17	—	-.052	—	-.060	—	-.009	—	-.022	—	-.030	—	-.026	—
27.17	-.004	—	—	-.050	-.030	—	-.013	—	-.024	-.017	-.018	—	-.007
28.17	-.001	-.026	—	-.057	—	.014	-.009	-.014	—	-.019	—	.005	-.002
29.17	-.002	—	—	-.052	—	—	-.008	—	—	-.016	—	—	-.004
30.17	-.001	-.024	—	-.053	-.027	.013	-.004	-.009	—	-.012	-.006	.009	.002
31.17	-.005	—	—	-.047	-.018	—	-.009	—	—	-.014	-.006	—	.000
32.17	-.012	-.024	—	-.041	-.011	.052	-.013	-.017	—	-.017	-.008	.008	-.002
33.17	-.017	—	—	—	—	—	-.017	—	—	—	—	—	-.002
34.17	-.019	-.030	-.040	-.047	-.012	.034	-.013	-.024	-.027	-.022	-.004	.015	.002
35.17	-.009	—	—	—	—	—	-.009	—	—	—	—	—	-.010
36.17	-.014	-.025	-.043	-.065	-.052	.021	-.010	-.012	-.014	-.018	-.010	.007	-.018
37.17	-.018	—	—	—	—	—	-.008	—	—	—	—	—	-.001
38.15	-.011	-.025	-.038	-.061	-.040	-.005	.025	.015	.004	-.008	-.011	-.011	.012
38.40	-.005	—	—	—	—	—	.054	—	—	—	—	—	.013
38.65	-.007	—	—	—	—	—	.029	—	—	—	—	—	.010
38.90	-.011	—	—	—	—	—	.009	—	—	—	—	—	-.009
39.15	-.026	-.079	-.105	-.101	-.067	-.024	-.045	-.054	-.066	-.061	-.060	-.052	-.081

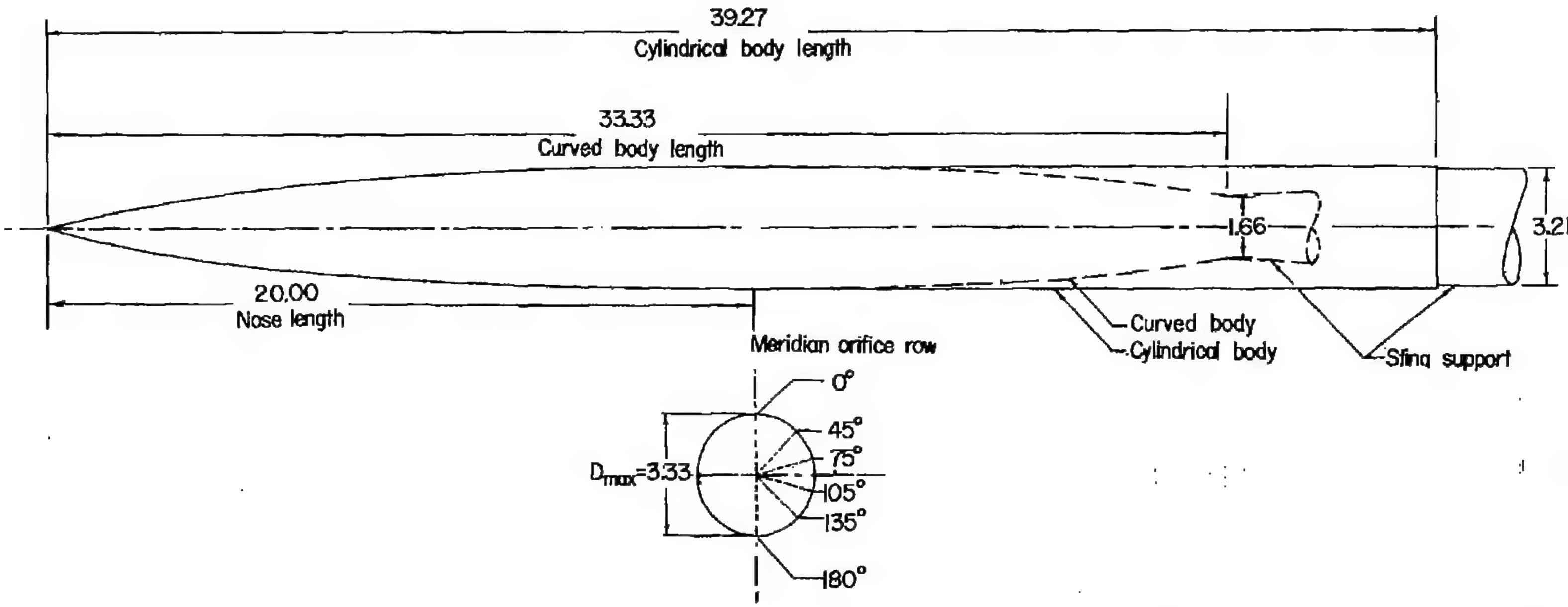


Figure 1.- Body details. (Linear dimensions in inches.)

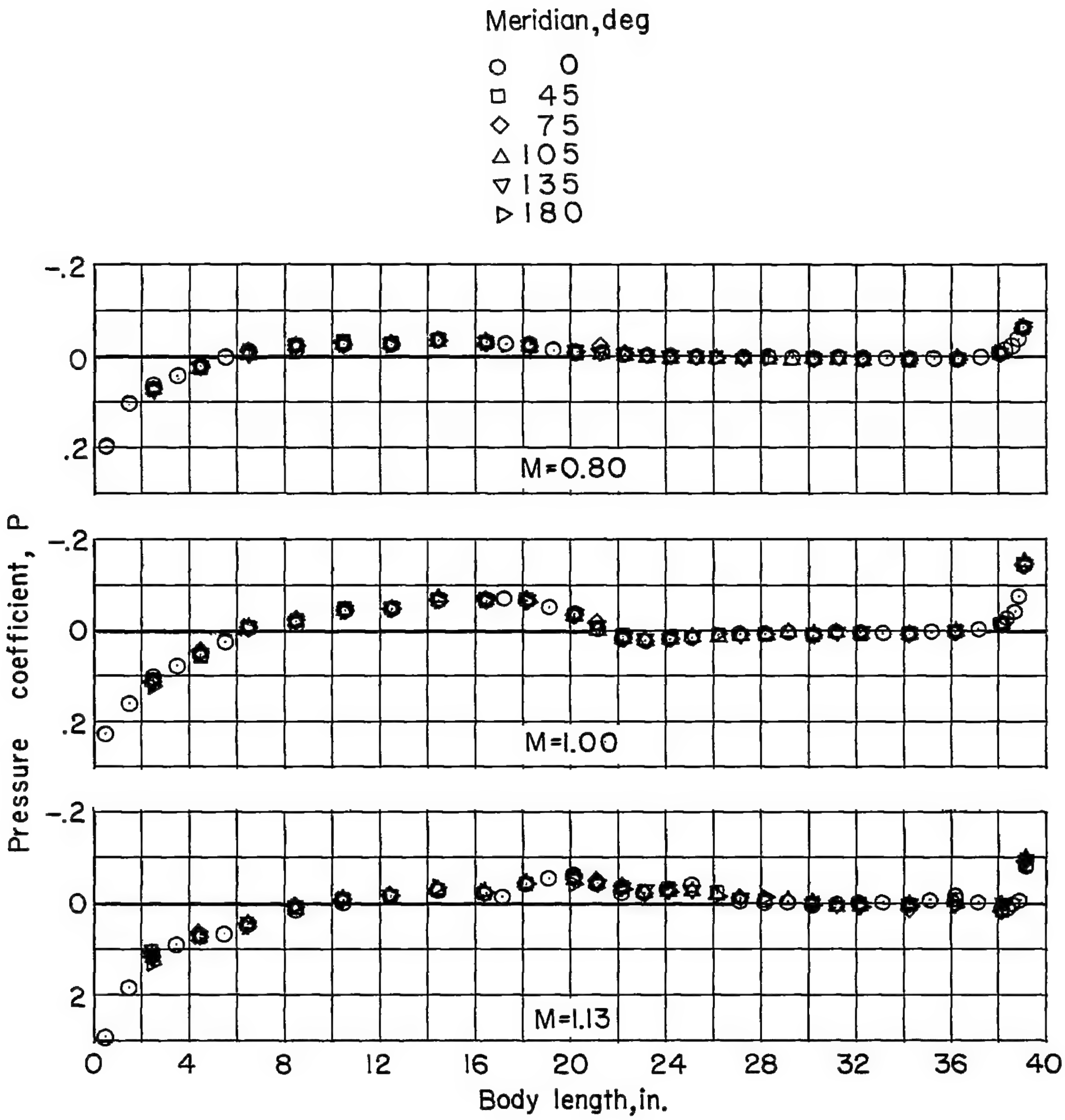


Figure 2.- Accuracy of pressure measurements. $\alpha = 0^{\circ}$.

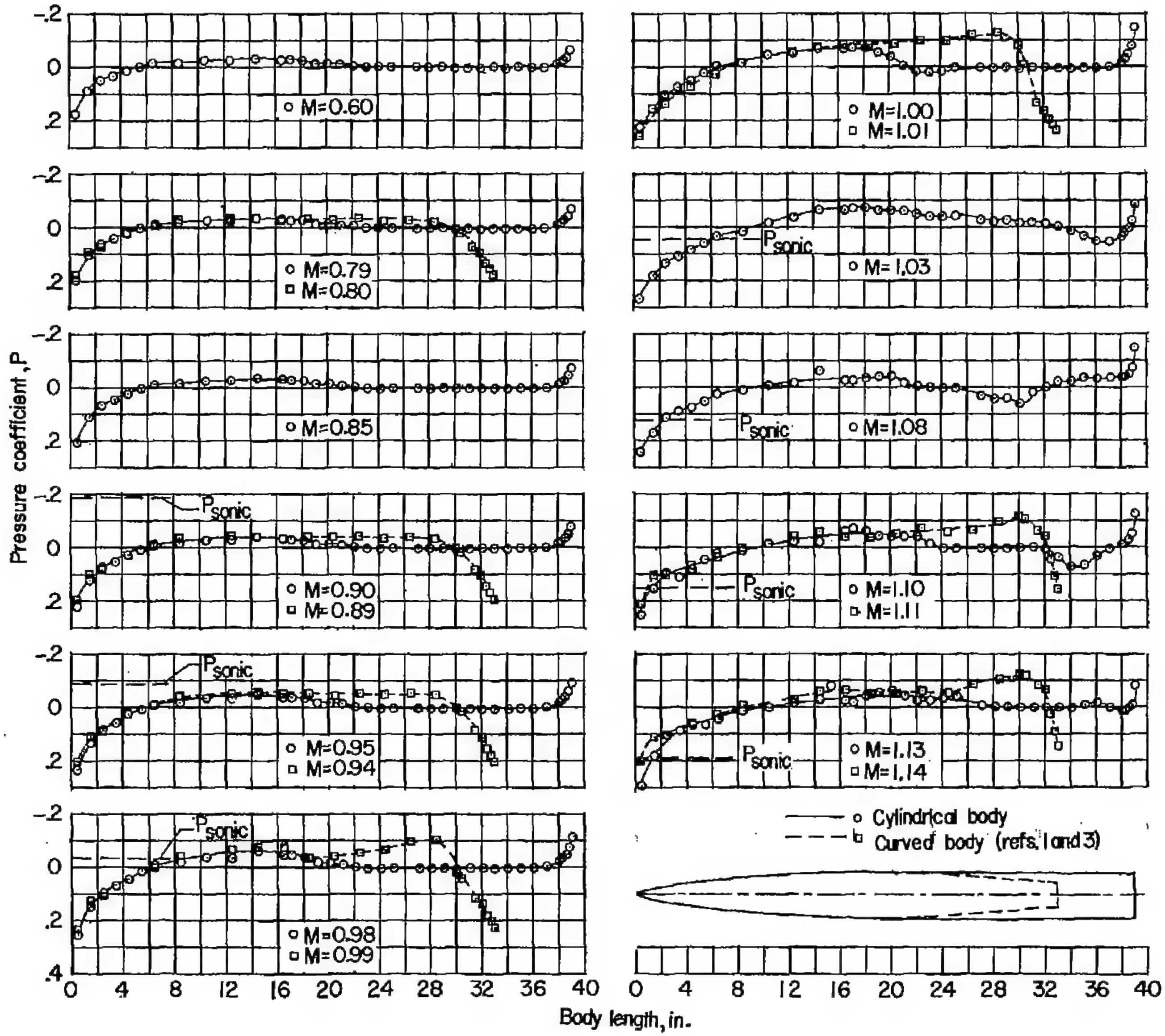
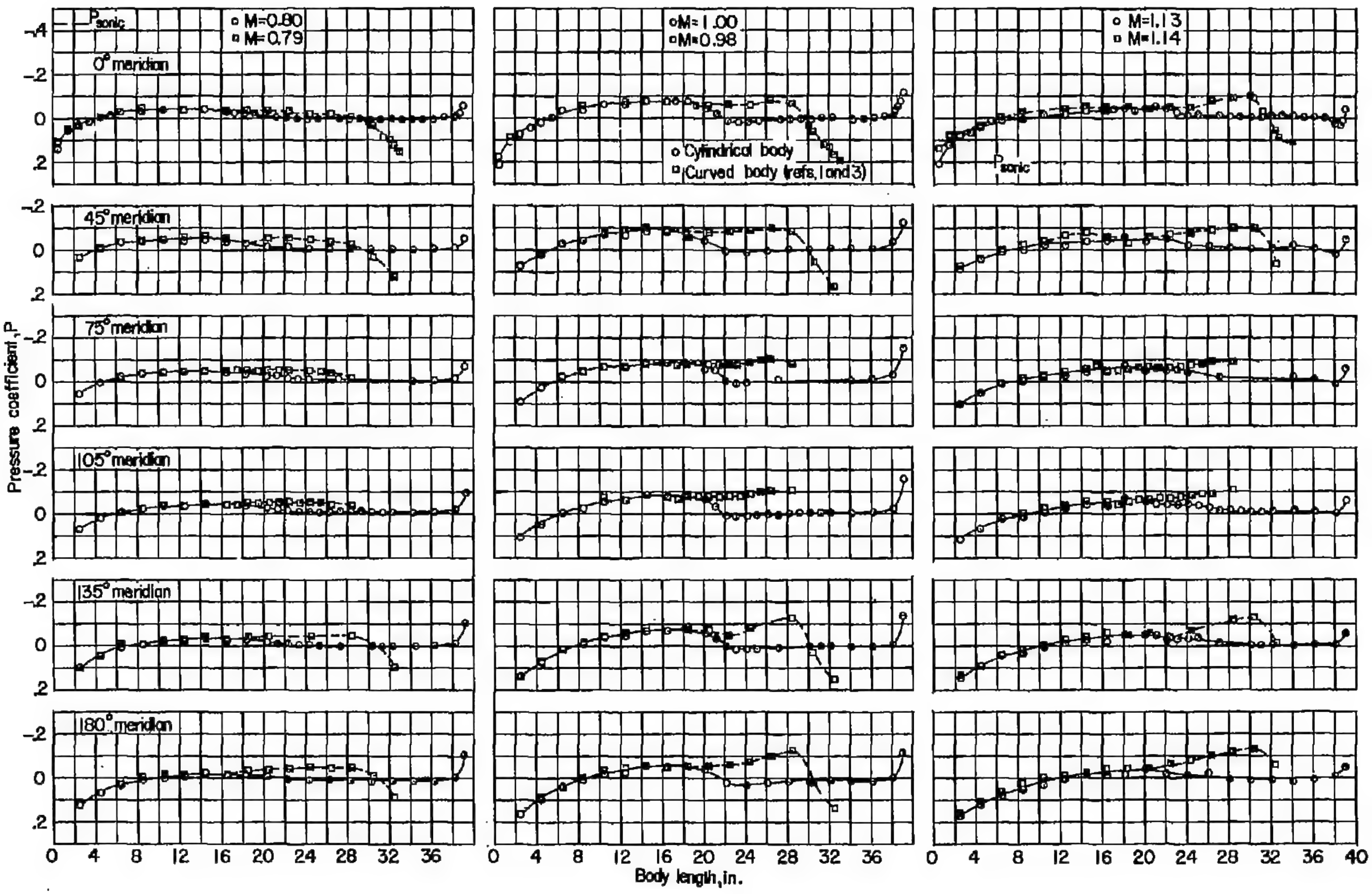
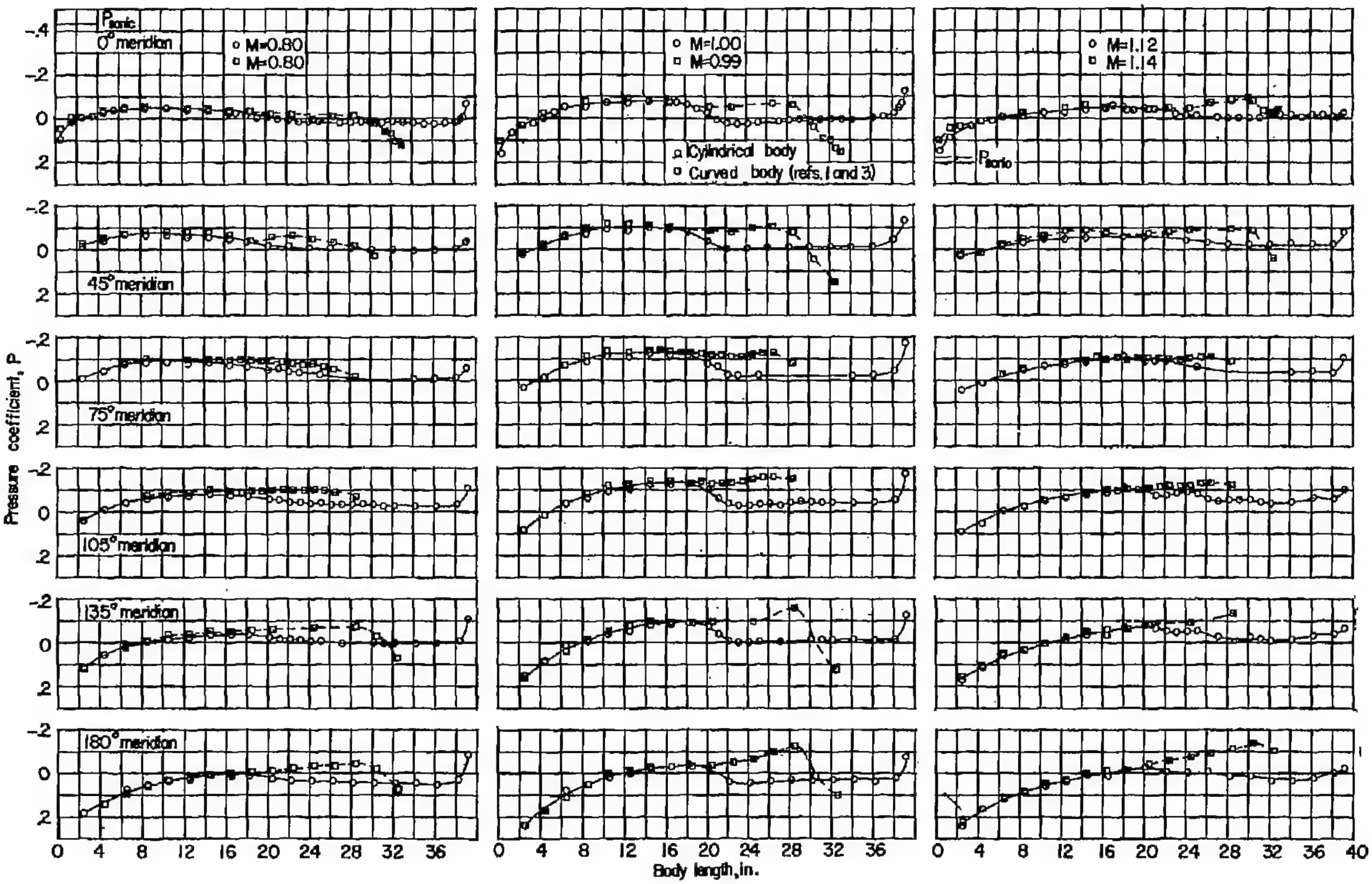


Figure 3.- Longitudinal pressure distribution at zero angle of attack.



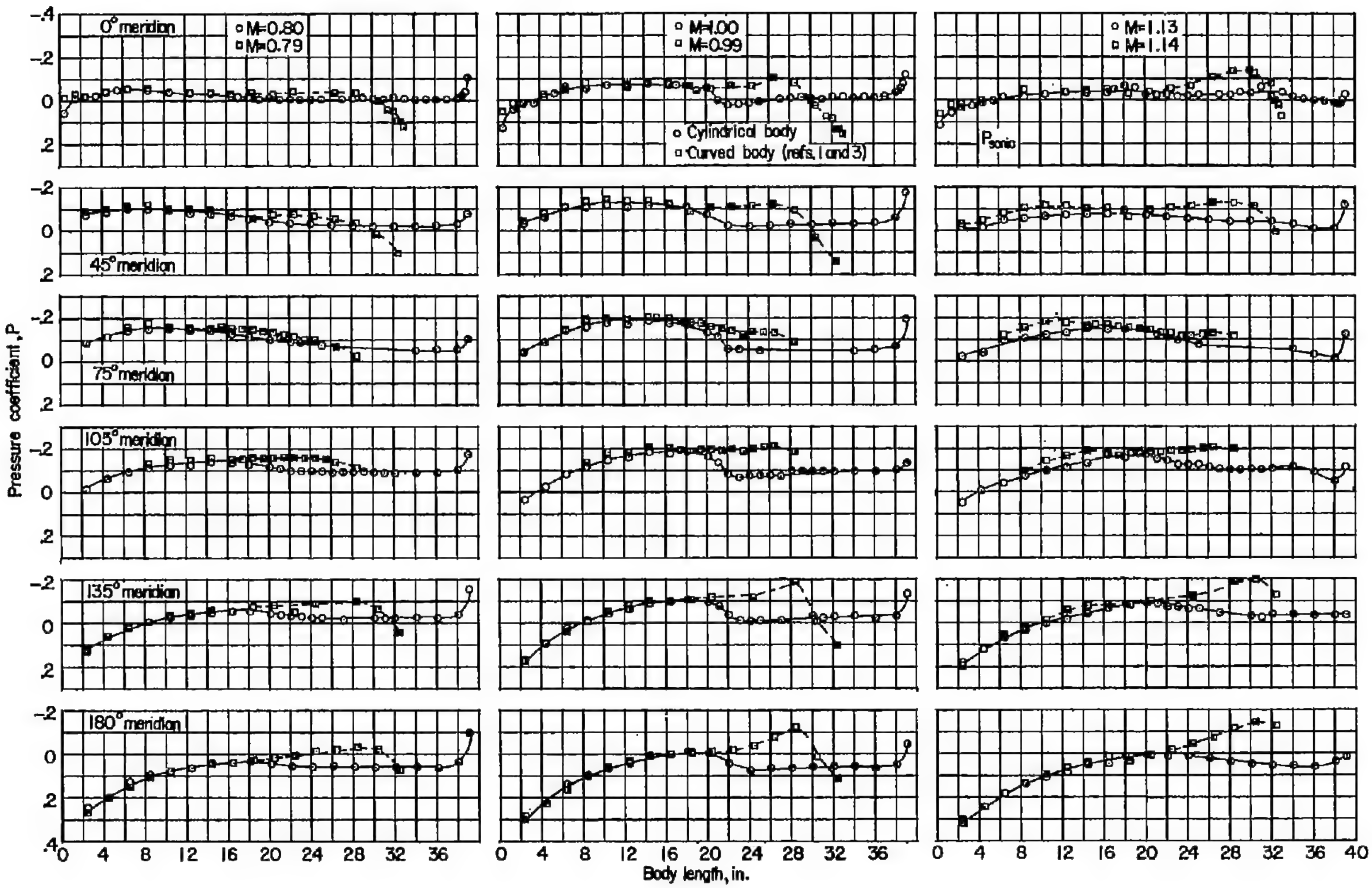
(a) $\alpha = 4^{\circ}$.

Figure 4.- Longitudinal pressure distribution at six radial stations.



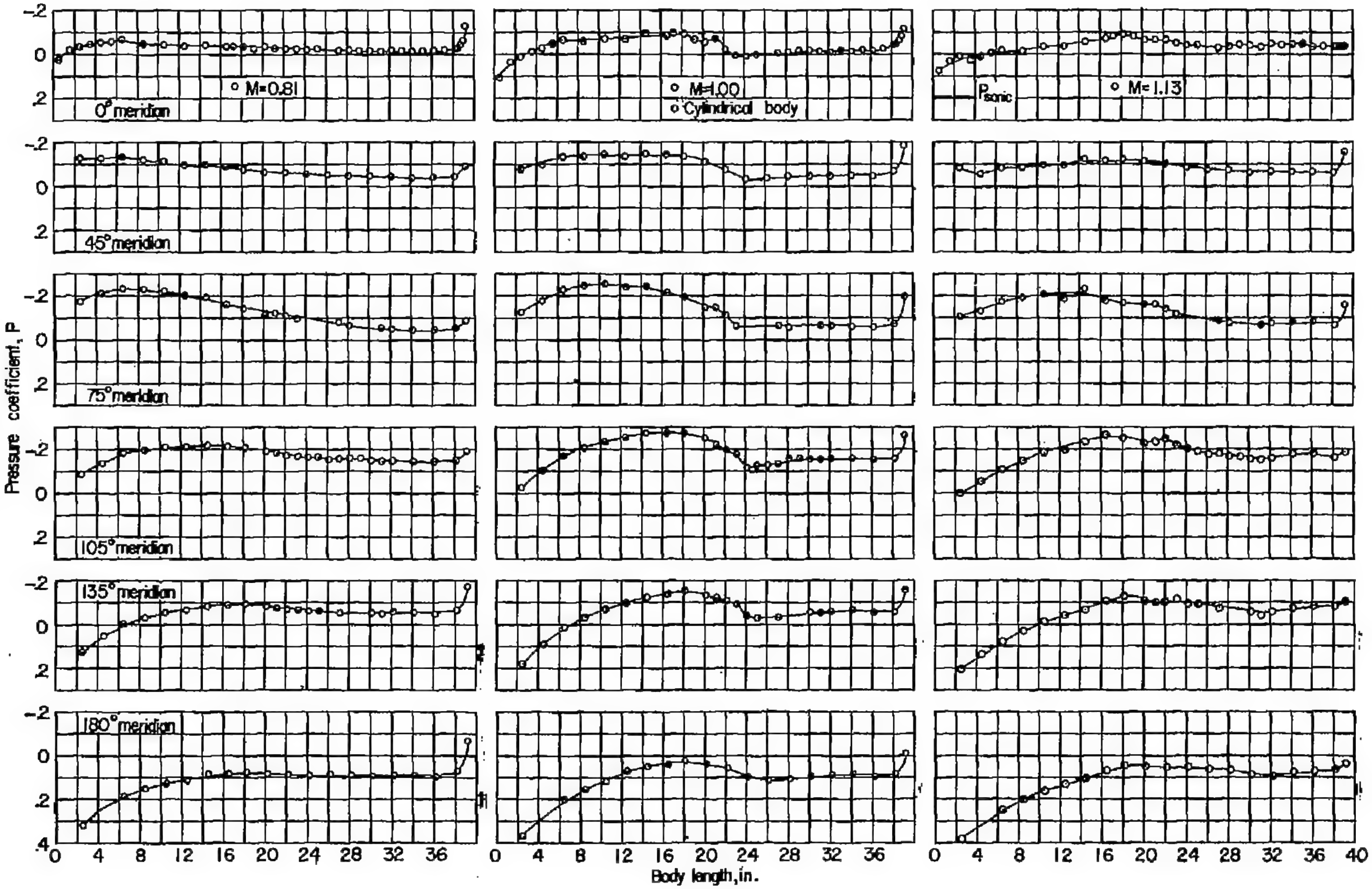
(b) $\alpha = 8^{\circ}$.

Figure 4.- Continued.



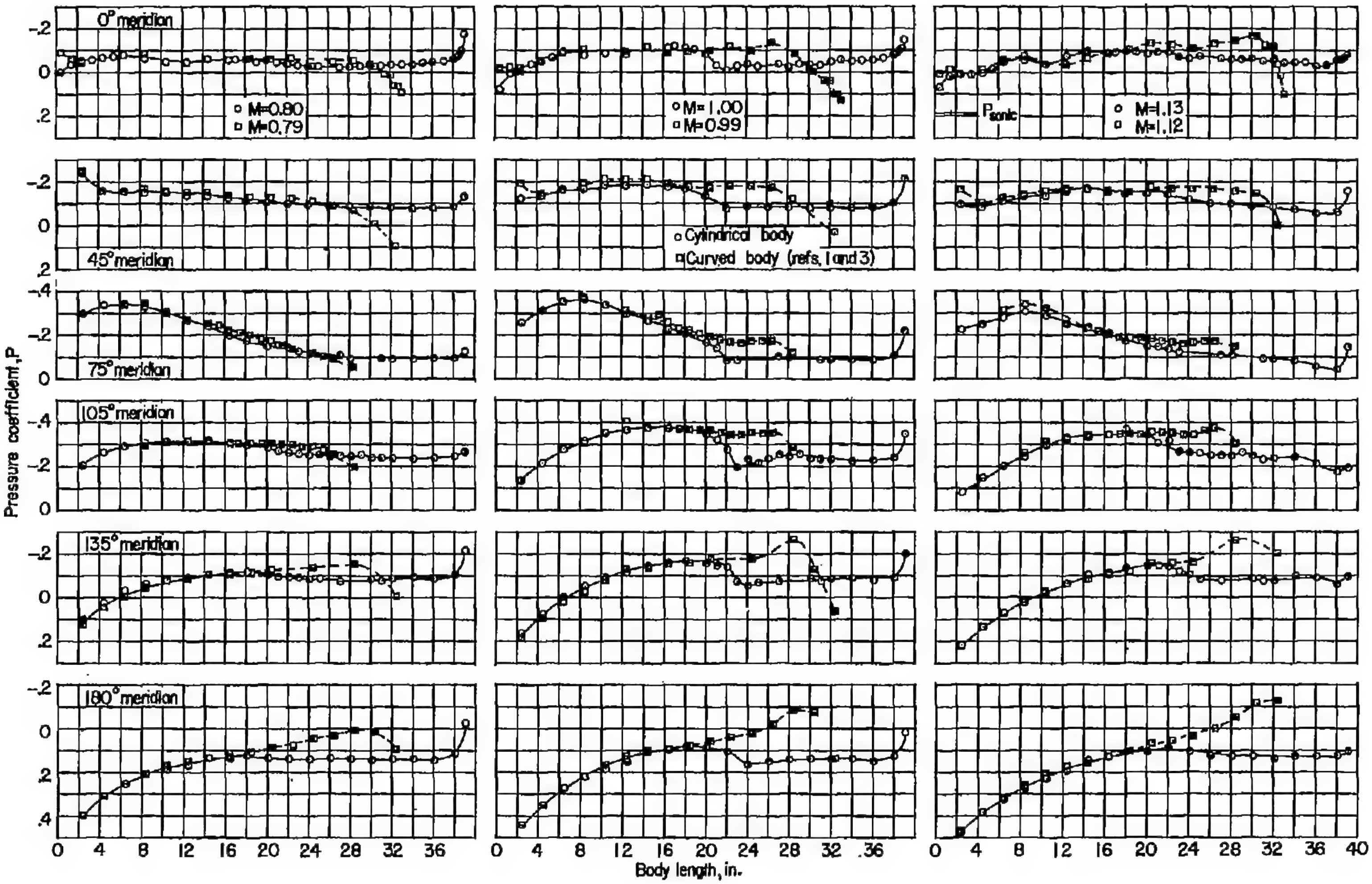
(c) $\alpha = 12^{o}$.

Figure 4.- Continued.



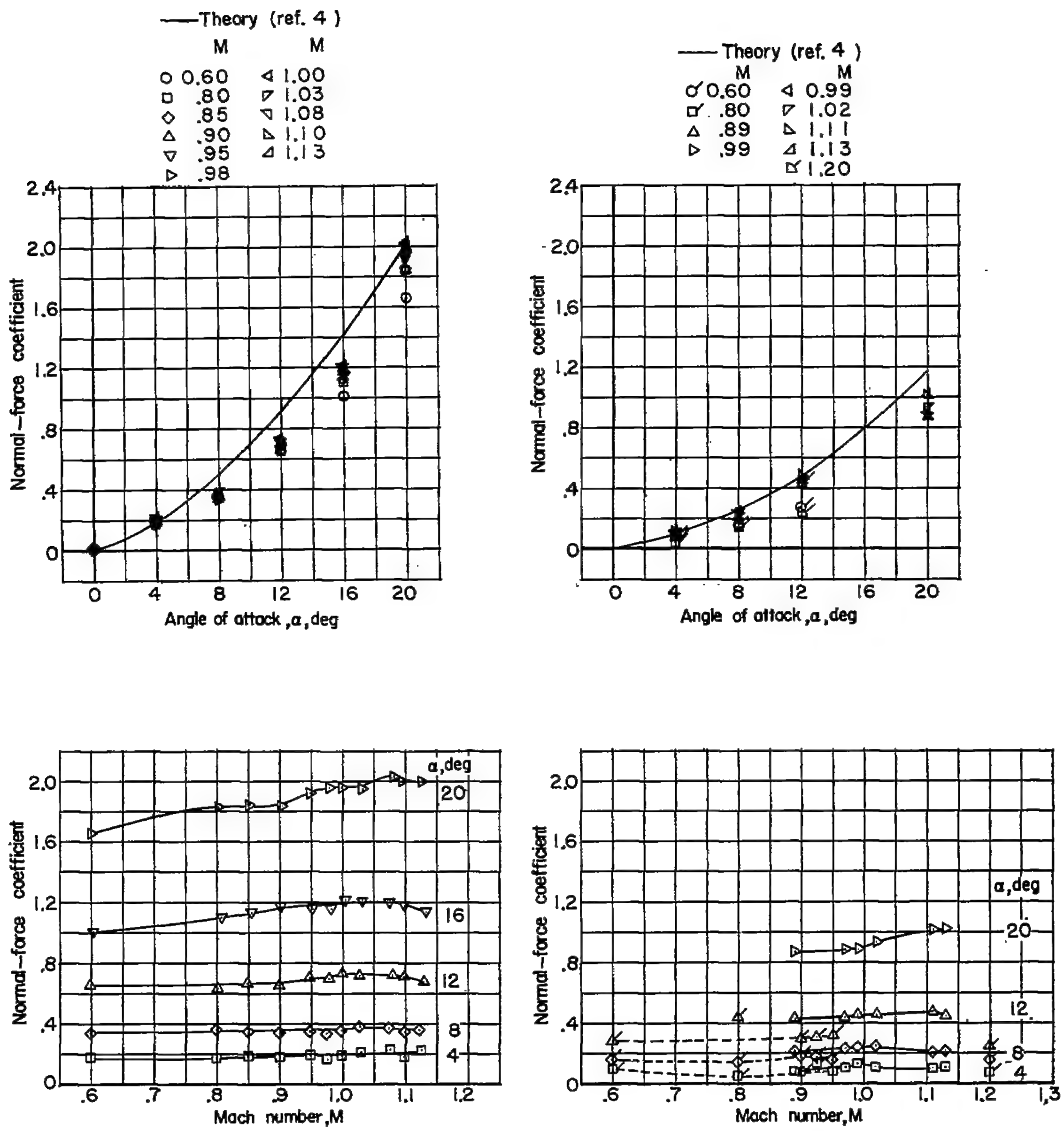
(d) $\alpha = 16^{\circ}$.

Figure 4.- Continued.



(e) $\alpha = 20^{\circ}$.

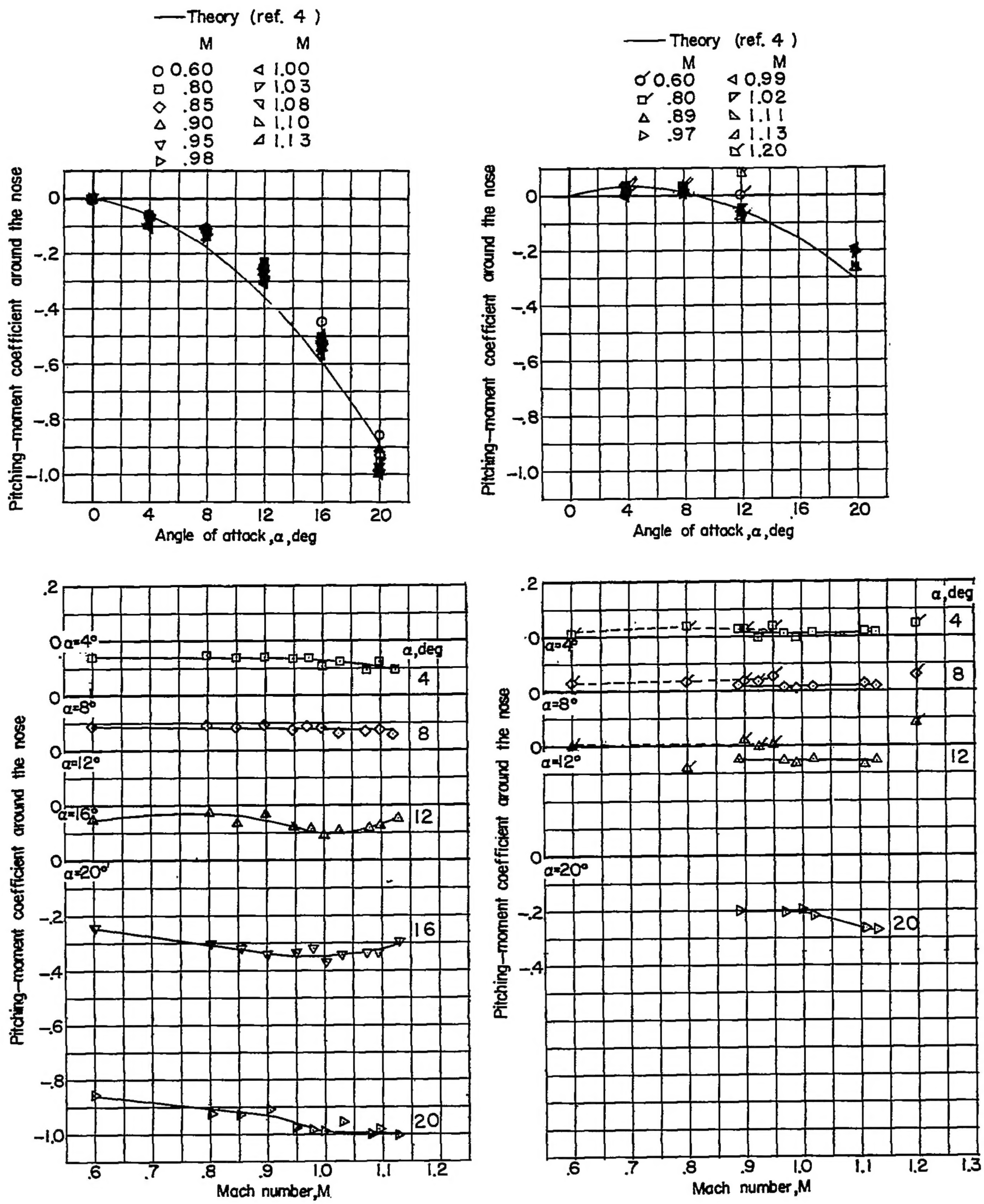
Figure 4.- Concluded.



(a) Cylindrical body.

(b) Curved body.

Figure 5.- Comparison of normal-force coefficients. (Flagged symbols represent data from closed-throat tunnel; unflagged symbols represent data from slotted-throat tunnel.)



(a) Cylindrical body.

(b) Curved body.

Figure 6.- Comparison of pitching-moment coefficients. (Flagged symbols represent data from closed-throat tunnel; unflagged symbols represent data from slotted-throat tunnel.)

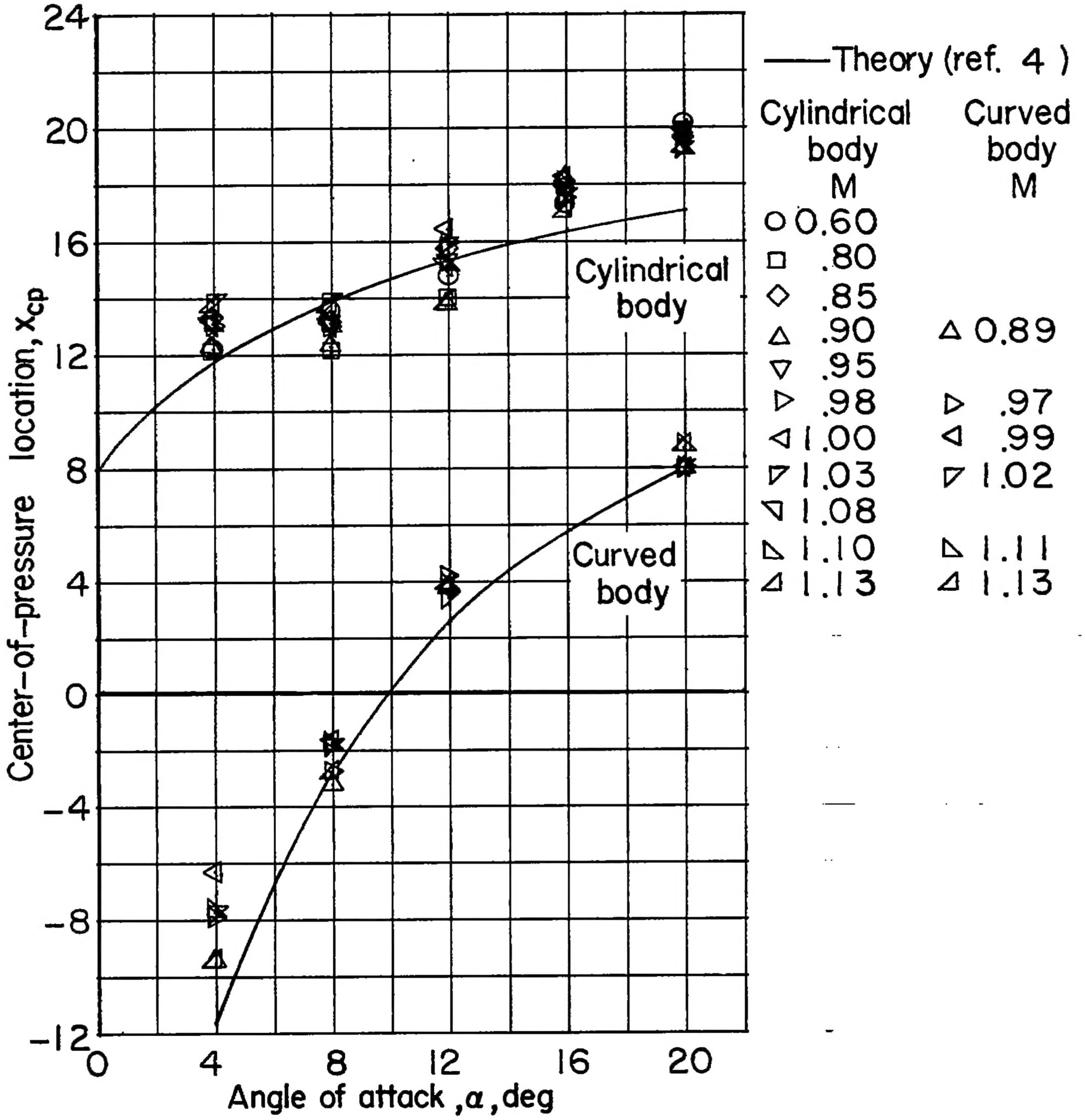


Figure 7.- Comparison of center-of-pressure locations.

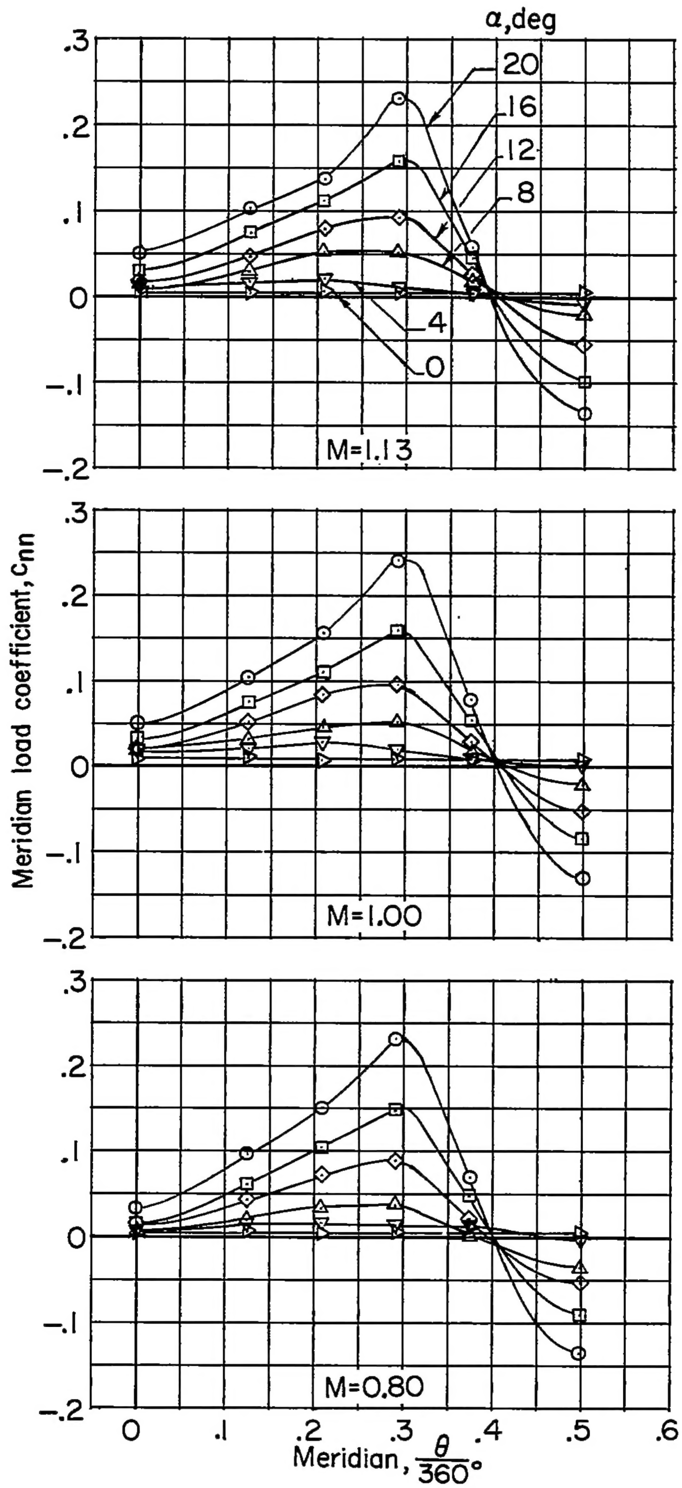


Figure 8.- Meridian load coefficient. Cylindrical body.

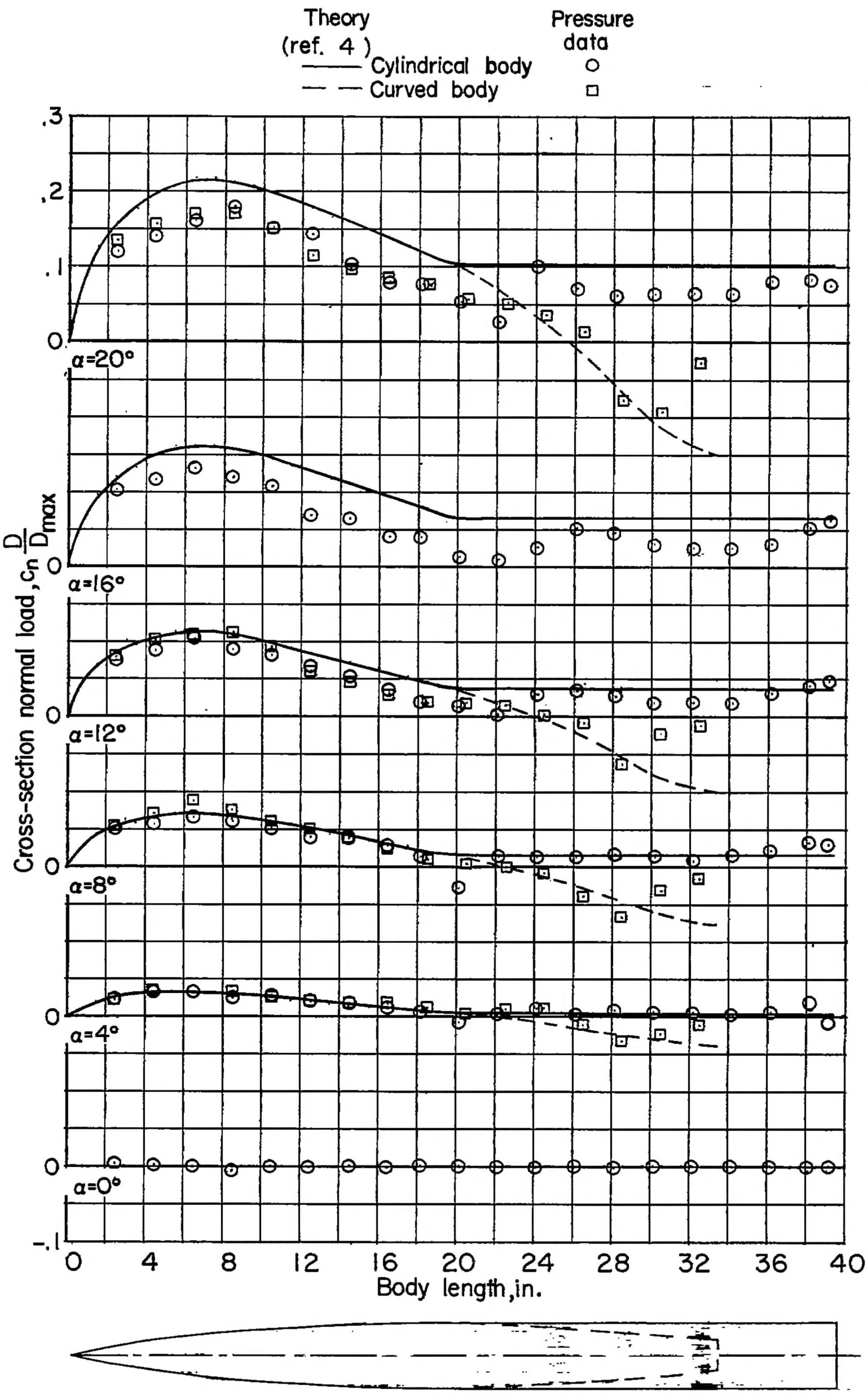


Figure 9.- Comparison of cross-section normal loads. M = 1.00.

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